# **Exhibit C**



Johnson Vineyard ECP Hydrology Study R1 01/09/20

## Johnson Vineyard 3363 Hwy 128 - Hydrology Study

Prepared by Napa Valley Vineyard Engineering, Inc March 27 2019, January 9, 2020 Revision 1

### INTRODUCTION

Johnson Vineyard seek approval of approximately 7.09 net acres of new vineyard. The project lies within APN 017-160-038, a 40.0 acre parcel located at 3363 Hwy 128, Calistoga.

This hydrology study is to determine the anticipated affect the proposed vineyard development project will have on local hydrology and runoff patterns in areas A thru D. Hydrologic modeling of existing and proposed conditions was performed using HydroCad, Urban Hydrology for Small Watersheds with the CA-1 rainfall distribution curve. Following is a summary of the data used to complete the hydrologic analysis and the results of this analysis.

### RAINFALL DATA

Rainfall depths for the project site were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2, Precipitation Frequency Data for California, which uses the latitude and longitude of the Johnson Vineyard project are estimated to be 38.5891 N, -122.6255 W, based on information obtained from (NOAA) Atlas 14 site.

The following rainfall data from the NOAA website was used in the analysis:

2 year, 24 hour 5.09 inches 100 year, 24 hour 11.9 inches

Rainfall data for the interim storm events were interpolated as:

5 year, 24 hour	6.58 inches
10 year, 24 hour	7.75 inches
25 year, 24 hour	9.43 inches
50 year, 24 hour	10.7 inches

### WATERSHED AREAS

The four project sites drain towards unnamed streams thence lies in Blossom Creek Subwatershed. The points of interest for this analysis are points along the streams. The watershed for Area A is approximately 28.40 acres, Area B 2.45 acres, Area C 24.90 acres and Area D 15.05 and was delineated based on topographic data from the Napa County GIS Data Base website. The maps included in Appendix A, depict the watershed, the existing land uses, and the proposed vineyard project.

#### PRE-PROJECT WATERSHED CONDITIONS

### Soil Types

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County, August 1978, maps the following soil types within the watershed:

- SCS #101, Aiken loam 2 to 15% slopes (Hydrologic Soil Group (HSG) C)
- SCS #103, Bale loam 0 to 2% slopes (Hydrologic Soil Group (HSG) B)
- SCS #105, Bale clay loam 2 to 5% slopes (Hydrologic Soil Group (HSG) B)
- SCS #139, Forward gravelly loam 9 to 30% slopes (Hydrologic Soil Group (HSG) B)
- SCS #140, Forward gravelly loam 30 to 75% slopes (Hydrologic Soil Group (HSG) B)
- SCS #141, Forward kidd complex 50 to 75% slopes (Hydrologic Soil Group (HSG) C)

#### Land Use

Land use within the subject watersheds was analyzed based on the 2017 Google aerial photograph obtained from the Google GIS website. Area A consists of 2.61 acres of grasslands with scattered brush, 20.71 acres of tree canopy, 4.83 acres of existing vineyard and 0.24 acres of existing developed areas. Area B consists of 0.08 acres of grasslands with scattered brush, 1.44 acres of tree canopy and 0.94 acres of existing vineyard. Area C consists of 2.55 acres of grasslands with scattered brush, 18.05 acres of tree canopy, 2.34 acres of existing vineyard, 1.57 acres of water surface and 0.39 acres of existing developed areas. Area D consists of 1.42 acres of grasslands with scattered brush, 12.92 acres of tree canopy, and 0.71 acres of existing vineyard areas. The grasslands and scatter brush areas are considered to be in a "good" to "fair" condition, and the tree areas are considered to be in a "fair" condition. A detailed breakdown of land use by area and hydrologic soil group is included in the HydroCad Reports, Appendix A.

### Time of Concentration

The time of concentration represents the time it takes for rainfall in the most hydraulically remote portion of the watershed to reach the point of interest. The time of concentration was estimated assuming sheet flow for 100 feet in the uppermost reaches of the watershed. A shallow concentrated flow regime was used to model the runoff down to the point of interest. Mannings coefficients were selected to represent the respective surface conditions. A detailed breakdown of the time of concentration parameters is included in the HydroCad Reports, Appendix A and are shown on the Drainage Area Map.

#### POST PROJECT WATERSHED CONDITIONS

## Soil Types

The proposed vineyard development occurs within the areas mapped as

- SCS #101, Aiken loam 2 to 15% slopes (Hydrologic Soil Group (HSG) C)
- SCS #103, Bale loam 0 to 2% slopes (Hydrologic Soil Group (HSG) B)
- SCS #105, Bale clay loam 2 to 5% slopes (Hydrologic Soil Group (HSG) B)
- SCS #139, Forward gravelly loam 9 to 30% slopes (Hydrologic Soil Group (HSG) B)
- SCS #140, Forward gravelly loam 30 to 75% slopes (Hydrologic Soil Group (HSG) B)
- SCS #141, Forward kidd complex 50 to 75% slopes (Hydrologic Soil Group (HSG) C)

### **Land Use**

The proposed project will convert 7.93 acres of trees, 1.44 acres of brush and pasture grasses. Some development areas with-in the proposed vineyard areas will be relocated by avenues around the vineyard areas. The project proposes a no-till cover crop with spot spray only, which is considered a "good" hydrologic condition. Vineyard avenues/turnspaces will be maintained in a no-till cover and are modeled as part of the vineyard. All other areas within the watershed are assumed to remain unchanged including the all weather access road to the house in the project area. A detailed breakdown of land uses by area and hydrologic soil group is included in the HydroCad Reports, Appendix A.

### Time of Concentration

Time of concentration under post-project conditions will not increase in the watersheds The erosion control measures provided within the project area include. The time of concentration is estimated assuming sheet flow for 100 feet in the uppermost reaches of each watershed area, and shallow concentrated flow over the hillside to the POI. A detailed breakdown of the time of concentration parameters is included in the HydroCad Report.

### **CALCULATED RUNOFF RATE**

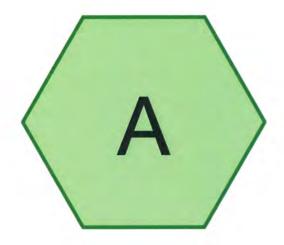
Using the rainfall data, watershed area, land use and time of concentration parameters described above and included in Appendix A, the following runoff rates were calculated:

HydroCad Calculated Peak Runoff Rate (cfs)

24 hr. storm event	2 :	2 yr.   5 yr.			10 yr.		25 yr.		50 yr.		100 yr.	
Project Condition	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
Watershed A	3.62	3.62	6.93	6.93	9.85	9.85	14.35	14.35	17.93	17.93	21.40	21.40
Watershed B	0.33	0.33	0.66	0.66	0.94	0.94	1.39	1.39	1.74	1.74	2.08	2.08
Watershed C	7.28	7.28	11.51	11.51	14.99	14.99	20.12	20.12	24.05	24.05	27.79	27.79
Watershed D	2.55	2.55	4.66	4.66	6.50	6.50	9.31	9.31	11.52	11.52	13.67	13.67

### CONCLUSION

The hydrologic analysis presented above and supporting information in the Appendix, demonstrate that the proposed vineyard development with appropriate mitigation measures will not increase the peak runoff rate in the affected watersheds.



# PRE WS A









# Summary for Subcatchment A: PRE WS A

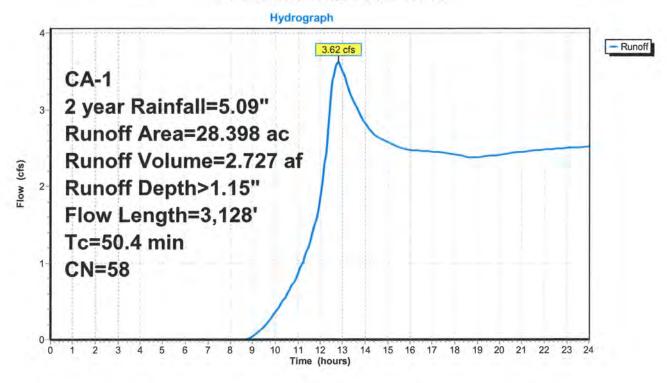
Runoff = 3.62 cfs @ 12.79 hrs, Volume=

2.727 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 year Rainfall=5.09"

Area	(ac) C	N Des	cription					
19	.508 5	55 Woo	ds, Good,	HSG B				
1	.208 7	70 Woo	ds, Good,	HSG C				
1	.162 4	l8 Brus	h, Good, I	HSG B				
0	.202 6	31 >75°	% Grass co	over, Good	, HSG B			
1	.248 7	74 >75°	75% Grass cover, Good, HSG C					
0	.124 8	35 Grav	/el roads, l	HSG B				
0	.115 8	39 Grav	rel roads, l	HSG C				
* 4	.141 6			d, Good, HS				
* 0	.690 7	'5 >75°	% Vineyard	d, Good, HS	SG C			
28	.398 5	8 Wei	ghted Aver	age				
28	.398	100.	00% Pervi	ous Area				
Tc	Length	Slope	Velocity	Capacity	Description			
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)				
7.4	100	0.1600	0.22		Sheet Flow, Pre WS A			
					Woods: Light underbrush n= 0.400 P2= 5.09"			
2.1	184	0.0815	1.43		Shallow Concentrated Flow, Pre WS A			
					Woodland Kv= 5.0 fps			
3.7	633	0.3333	2.89		Shallow Concentrated Flow, Pre WS A			
					Woodland Kv= 5.0 fps			
37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Pre WS A			
37.2	2,211 3,128	0.0393	0.99		Shallow Concentrated Flow, Pre WS A Woodland Kv= 5.0 fps			

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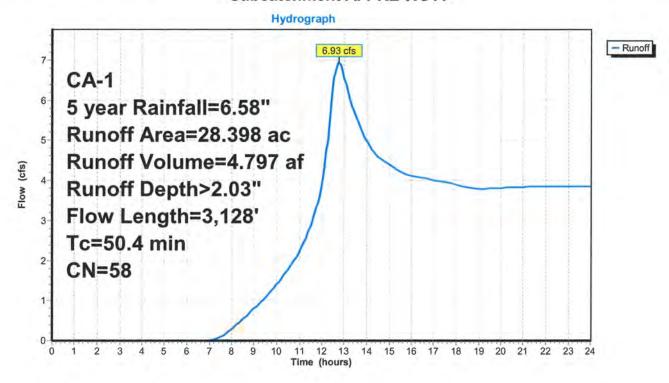
# Summary for Subcatchment A: PRE WS A

Runoff = 6.93 cfs @ 12.74 hrs, Volume=

4.797 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 year Rainfall=6.58"

	Area	(ac) C	N Des	cription					
	19.	508	55 Woo	ds, Good,	HSG B				
	1.	208	70 Woo	ods, Good,	HSG C				
	1.	162	48 Brus	sh, Good, I	HSG B				
	0.	202	31 >75°	% Grass c	over, Good	, HSG B			
	1.	248	74 >75	>75% Grass cover, Good, HSG C					
	0.	124	85 Grav	vel roads, l	HSG B				
	0.	115	89 Grav	vel roads, l	HSG C				
*	4.	141	31 >75°	% Vineyard	d, Good, H	SG B			
*	0.	690	75 >75°	% Vineyard	d, Good, H	SG C			
	28.	398	58 Wei	ghted Avei	rage				
	28.	398	100.	00% Pervi	ous Area				
	Тс	Length	Slope	Velocity	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	7.4	100	0.1600	0.22		Sheet Flow, Pre WS A			
						Woods: Light underbrush n= 0.400 P2= 5.09"			
	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Pre WS A			
						Woodland Kv= 5.0 fps			
	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Pre WS A			
						Woodland Kv= 5.0 fps			
	37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Pre WS A			
_						Woodland Kv= 5.0 fps			
	50.4	3,128	Total						



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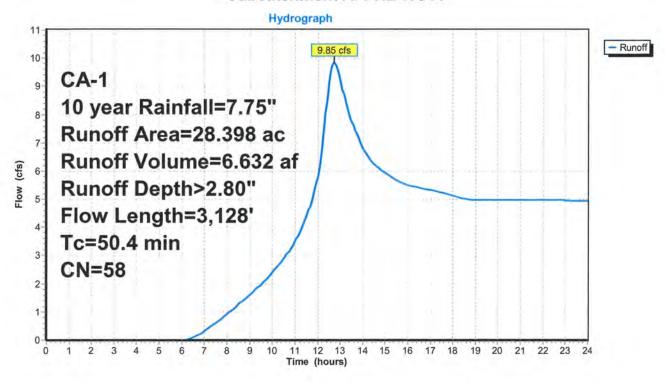
## Summary for Subcatchment A: PRE WS A

Runoff = 9.85 cfs @ 12.72 hrs, Volume=

6.632 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 year Rainfall=7.75"

Area	a (ac)	N Des	cription								
19	9.508	55 Woo	Woods, Good, HSG B								
•	1.208		ds, Good,								
	1.162	48 Brus	sh, Good, F	HSG B							
(	).202	61 >75°	% Grass co	over, Good	, HSG B						
•	1.248	74 >75°	>75% Grass cover, Good, HSG C								
(	).124	85 Grav	/el roads, l	HSG B							
(	).115	89 Grav	∕el roads, l	HSG C							
* 4	1.141 (		•	d, Good, H							
* (	0.690	75 >75°	% Vineyard	d, Good, H	SG C						
28	3.398	58 Wei	ghted Aver	age							
28	3.398	100.	00% Pervi	ous Area							
To		Slope	Velocity	Capacity	Description						
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)							
7.4	100	0.1600	0.22		Sheet Flow, Pre WS A						
					Woods: Light underbrush n= 0.400 P2= 5.09"						
2.1	184	0.0815	1.43		Shallow Concentrated Flow, Pre WS A						
					Woodland Kv= 5.0 fps						
3.7	633	0.3333	2.89		Shallow Concentrated Flow, Pre WS A						
					Woodland Kv= 5.0 fps						
37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Pre WS A						
					Woodland Kv= 5.0 fps						
50.4	3,128	Total									



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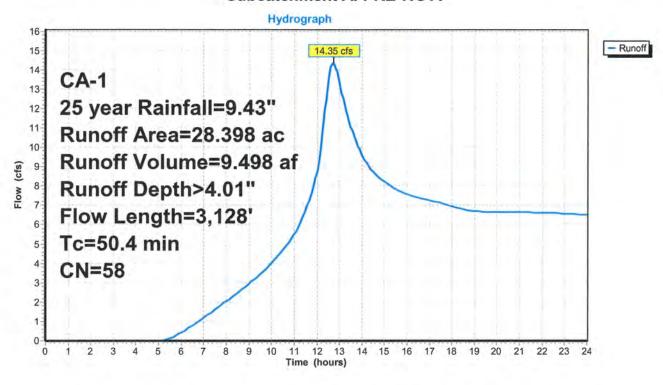
# Summary for Subcatchment A: PRE WS A

Runoff = 14.35 cfs @ 12.71 hrs, Volume=

9.498 af, Depth> 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 year Rainfall=9.43"

Are	a (ac)	CN Des	cription		
1	9.508	55 Woo	ods, Good,	HSG B	
	1.208	70 Woo	ds, Good,	HSG C	
	1.162	48 Brus	sh, Good, H	HSG B	
	0.202	61 >75	% Grass c	over, Good	, HSG B
	1.248	74 > 75	% Grass c	over, Good	, HSG C
	0.124	85 Grav	vel roads, l	HSG B	
	0.115	89 Grav	vel roads, l	HSG C	
*	4.141			d, Good, H	
*	0.690	75 >75	% Vineyard	d, Good, H	SG C
2	3.398	58 Wei	ghted Avei	age	
2	3.398	100.	00% Pervi	ous Area	
To			Velocity	Capacity	Description
(min	(feet)	(ft/ft)	(ft/sec)	(cfs)	
7.4	100	0.1600	0.22		Sheet Flow, Pre WS A
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		Shallow Concentrated Flow, Pre WS A
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		Shallow Concentrated Flow, Pre WS A
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Pre WS A
				·····	Woodland Kv= 5.0 fps
50.4	3,128	Total			



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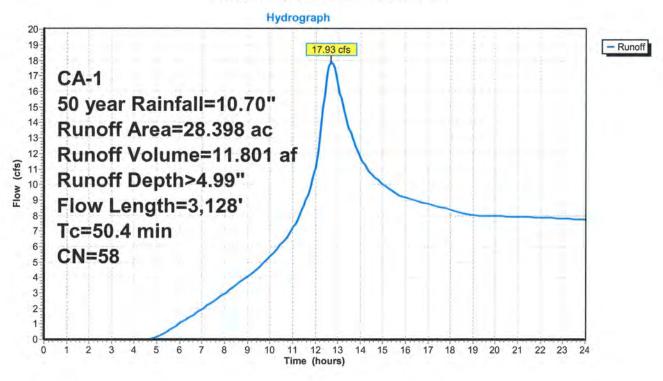
# Summary for Subcatchment A: PRE WS A

Runoff = 17.93 cfs @ 12.71 hrs, Volume=

11.801 af, Depth> 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 year Rainfall=10.70"

Area	(ac)	N Des	cription								
19	.508	55 Woo	ods, Good,	HSG B							
1	.208	70 Woo	oods, Good, HSG C								
1	.162	48 Brus	rush, Good, HSG B								
C	.202	61 >75°	>75% Grass cover, Good, HSG B								
1	.248	74 >75°	% Grass c	over, Good	, HSG C						
C	.124	85 Grav	vel roads, l	HSG B							
C	.115	89 Grav	vel roads, l	HSG C							
* 4	.141			d, Good, H							
<u>* C</u>	.690	75 >75°	% Vineyard	d, Good, HS	SG C						
28	.398	58 Wei	ghted Avei	age							
28	.398	100.	00% Pervi	ous Area							
Tc	Length	Slope	Velocity	Capacity	Description						
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	The state of the s						
7.4	100	0.1600	0.22		Sheet Flow, Pre WS A						
					Woods: Light underbrush n= 0.400 P2= 5.09"						
2.1	184	0.0815	1.43		Shallow Concentrated Flow, Pre WS A						
					Woodland Kv= 5.0 fps						
3.7	633	0.3333	2.89		Shallow Concentrated Flow, Pre WS A						
					Woodland Kv= 5.0 fps						
37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Pre WS A						
	***	****	····		Woodland Kv= 5.0 fps						
50.4	3,128	Total									



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# Summary for Subcatchment A: PRE WS A

Runoff = 21.40 cfs @ 12.70 hrs, Volume=

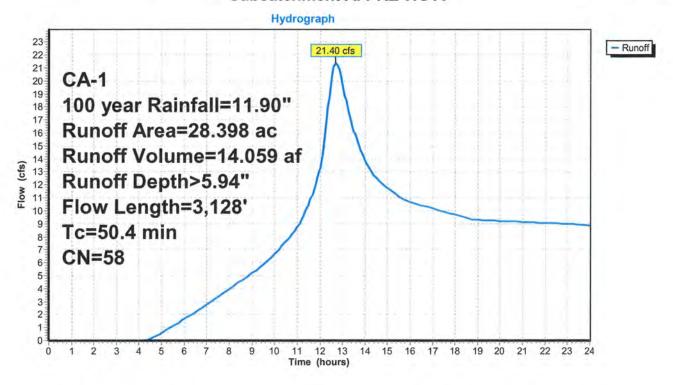
14.059 af, Depth> 5.94"

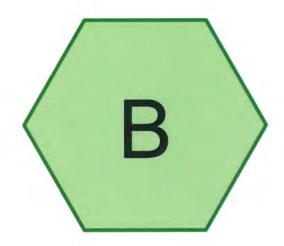
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 year Rainfall=11.90"

Area	(ac) C	N Des	cription		
19	.508	55 Woo	ods, Good,	HSG B	
1	.208	70 Woo	ods, Good,	HSG C	
1	.162	48 Brus	sh, Good, F	HSG B	
C	.202	31 >75°	% Grass co	, HSG B	
1	.248	74 >75°	% Grass c	over, Good	, HSG C
C	.124	35 Grav	vel roads, l	HSG B	
C	.115	89 Grav	vel roads, l	HSG C	
* 4	.141 (		•	d, Good, HS	
<u>* _ C</u>	.690	75 >75°	% Vineyard	d, Good, HS	SG C
28	.398	58 Wei	ghted Aver	age	
28	3.398	100.	00% Pervi	ous Area	
Tc	Length	Slope	Velocity	Capacity	Description
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	
7.4	100	0.1600	0.22		Sheet Flow, Pre WS A
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		Shallow Concentrated Flow, Pre WS A
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		Shallow Concentrated Flow, Pre WS A
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Pre WS A
					Woodland Kv= 5.0 fps
50.4	3,128	<del></del>			· · · · · · · · · · · · · · · · · · ·

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# PRE WS B





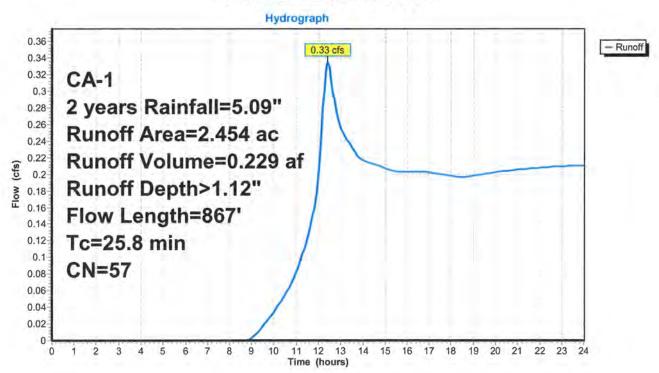




Runoff = 0.33 cfs @ 12.40 hrs, Volume= 0.229 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 years Rainfall=5.09"

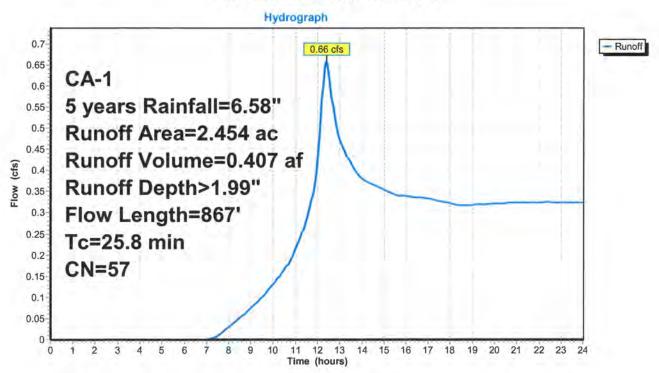
	Area	(ac) (	ON Des	cription		
	1.	437	55 Woo	ds, Good,	HSG B	
	0.	080	48 Brus	sh, Good, I	HSG B	
*	0.	937	61 >75	% Vineyard	d, Good, HS	SG B
	2.	454	57 Wei	ghted Aver	age	
	2.	454		00% Pervi		
(	Tc (min)	Length (feet)	100000000000000000000000000000000000000	Velocity (ft/sec)	Capacity (cfs)	Description
	11.2	100	0.0600	0.15		Sheet Flow, Pre WS B Grass: Bermuda n= 0.410 P2= 5.09"
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Pre WS B Short Grass Pasture Kv= 7.0 fps
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Pre WS B Woodland Kv= 5.0 fps
	25.8	867	Total			



Runoff 0.66 cfs @ 12.39 hrs, Volume= 0.407 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 years Rainfall=6.58"

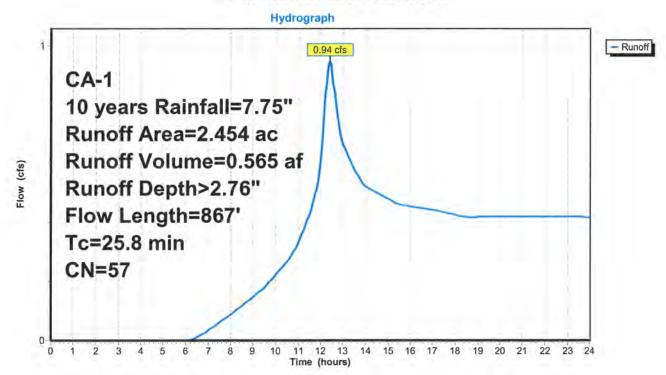
	Area	(ac) (	ON Des	cription		
				ods, Good,		
				sh, Good, I		00 B
_					d, Good, H	SG B
	2.	454		ghted Avei		
	2.	.454	100.	.00% Pervi	ous Area	
	Tc (min)	Length (feet)	make the second second second	Velocity (ft/sec)	Capacity (cfs)	Description
	11.2	100	0.0600	0.15		Sheet Flow, Pre WS B Grass: Bermuda n= 0.410 P2= 5.09"
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Pre WS B Short Grass Pasture Kv= 7.0 fps
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Pre WS B Woodland Kv= 5.0 fps
	25.8	867	Total			



Runoff = 0.94 cfs @ 12.38 hrs, Volume= 0.565 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 years Rainfall=7.75"

	Area	(ac)	CN De	scription						
	1.	437	55 Wo	ods, Good,	HSG B					
	0.	080	48 Bru	Brush, Good, HSG B						
*	0.	937	61 >7	5% Vineyard	d, Good, HS	SG B				
		454		eighted Ave						
	2.	454	100	0.00% Pervi	ous Area					
(	Tc min)	Length (feet)			Capacity (cfs)	Description				
- 5	11.2	100	0.0600	0.15		Sheet Flow, Pre WS B Grass: Bermuda n= 0.410 P2= 5.09"				
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Pre WS B Short Grass Pasture Kv= 7.0 fps				
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Pre WS B Woodland Kv= 5.0 fps				
1	25.8	867	Total							



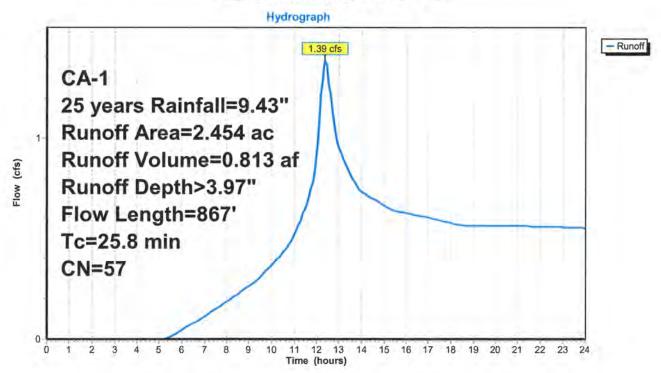
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## Summary for Subcatchment B: PRE WS B

Runoff = 1.39 cfs @ 12.37 hrs, Volume= 0.813 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 years Rainfall=9.43"

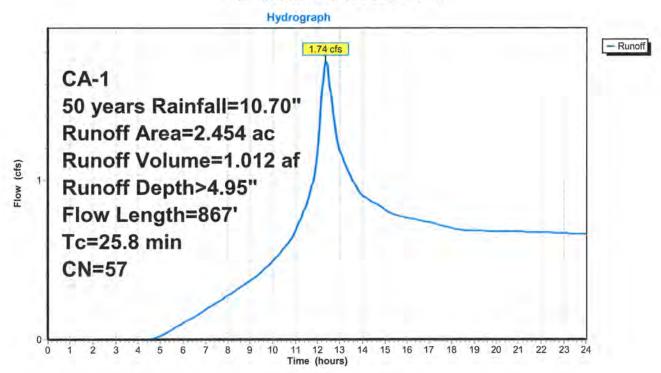
	Area	(ac) (	ON Des	cription							
	1.	437	55 Woo	Noods, Good, HSG B							
	0.	.080	48 Brus	Brush, Good, HSG B							
*	0.	.937	61 >75	% Vineyard	d, Good, HS	SG B					
		454 454		ghted Aver 00% Pervi							
1	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
	11.2	100	0.0600	0.15		Sheet Flow, Pre WS B Grass: Bermuda n= 0.410 P2= 5.09"					
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Pre WS B Short Grass Pasture Kv= 7.0 fps					
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Pre WS B Woodland Kv= 5.0 fps					
	25.8	867	Total								



Runoff = 1.74 cfs @ 12.37 hrs, Volume= 1.012 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 years Rainfall=10.70"

	Area	(ac) C	N Des	cription		
	1.	437	55 Woo	ds, Good,	HSG B	
	0.	080	48 Brus	h, Good, h	ISG B	
*	0.937		61 >75% Vineyard, Good,			SG B
				ghted Aver		
	2.	454	100.	00% Pervi	ous Area	
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	11.2	100	0.0600	0.15		Sheet Flow, Pre WS B Grass: Bermuda n= 0.410 P2= 5.09"
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Pre WS B Short Grass Pasture Kv= 7.0 fps
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Pre WS B Woodland Kv= 5.0 fps
	25.8	867	Total			

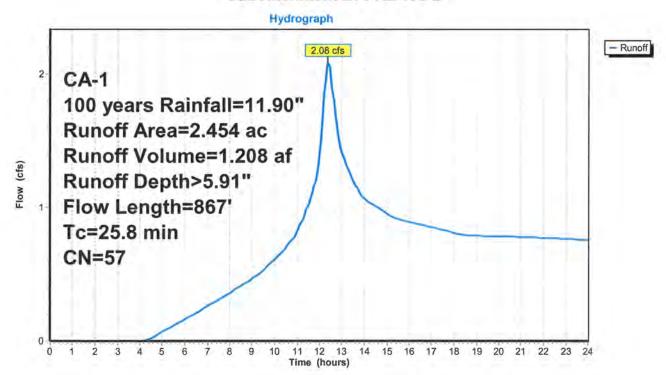


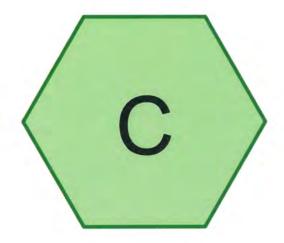
# Summary for Subcatchment B: PRE WS B

Runoff = 2.08 cfs @ 12.37 hrs, Volume= 1.208 af, Depth> 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 years Rainfall=11.90"

	Area	(ac) (	ON Des	cription					
	1.	.437	55 Woo	ds, Good,	HSG B				
	0.	.080	48 Brus	sh, Good, H	HSG B				
*	0.			75% Vineyard, Good, HSG B					
	2.	454	57 Wei	ghted Aver	age				
	2.	454	100.	00% Pervi	ous Area				
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description			
	11.2	100	0.0600	0.15		Sheet Flow, Pre WS B Grass: Bermuda n= 0.410 P2= 5.09"			
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Pre WS B Short Grass Pasture Kv= 7.0 fps			
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Pre WS B Woodland Kv= 5.0 fps			
	25.8	867	Total						





# PRE WS C









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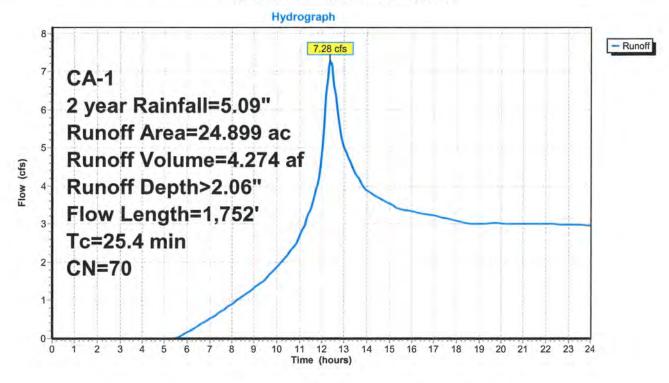
# Summary for Subcatchment C: PRE WS C

Runoff = 7.28 cfs @ 12.37 hrs, Volume=

4.274 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 year Rainfall=5.09"

Area	(ac) C	N Desc	cription							
5.	.834 6	30 Woo	ds, Fair, F	ISG B						
12.	.216	73 Woo	Woods, Fair, HSG C							
0.	.107 5	56 Brus	Brush, Fair, HSG B							
			Brush, Fair, HSG C							
			>75% Grass cover, Good, HSG B							
			>75% Grass cover, Good, HSG C							
					nes, 50% imp, HSG B					
				//open ditch	nes, 50% imp, HSG C					
			s, HSG B							
			s, HSG C							
			er Surface	•	00 B					
				d, Good, H	SG B					
			ghted Aver							
	.033	92.51% Pervious Area								
1.	.865	7.49% Impervious Area								
To	Longth	Clone	Volonity	Canacity	Description					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description					
8.9		0.1000		(CIS)	Chaot Flam Dra WC C					
8.9	100	0.1000	0.19		Sheet Flow, Pre WS C					
2.5	261	0.1187	1.72		Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C					
2.5	201	0.1107	1.72		Woodland Kv= 5.0 fps					
1.4	210	0.2380	2.44		Shallow Concentrated Flow, Pre WS C					
1.7	210	0.2300	2.47		Woodland Kv= 5.0 fps					
2.3	240	0.1250	1.77		Shallow Concentrated Flow, Pre WS C					
2.0	210	0.1200	1.77		Woodland Kv= 5.0 fps					
6.9	477	0.0524	1.14		Shallow Concentrated Flow, Pre WS C					
2.0	,		,		Woodland Kv= 5.0 fps					
3.4	464	0.2047	2.26		Shallow Concentrated Flow, Pre WS C					
υ.¬										
0.4					Woodland Kv= 5.0 fps					
25.4	1,752	Total			Woodland Kv= 5.0 fps					



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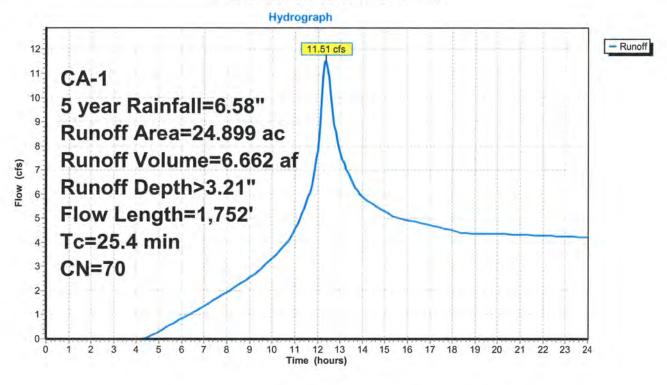
# Summary for Subcatchment C: PRE WS C

Runoff = 11.51 cfs @ 12.37 hrs, Volume=

6.662 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 year Rainfall=6.58"

Area	a (ac)	CN Des	cription							
;	5.834	60 Woo	Woods, Fair, HSG B							
1.	2.216	73 Woo	Woods, Fair, HSG C							
	0.107	56 Brus	Brush, Fair, HSG B							
	0.436		Brush, Fair, HSG C							
	1.893		>75% Grass cover, Good, HSG B							
	0.114		>75% Grass cover, Good, HSG C							
	0.080				nes, 50% imp, HSG B					
	).117				nes, 50% imp, HSG C					
	0.087		fs, HSG B							
	0.109		fs, HSG C							
	1.571		er Surface	•						
	2.335			d, Good, H	SG B					
	1.899		ghted Aver							
	3.033		92.51% Pervious Area							
	1.865	7.49	% Impervi	ous Area						
т.	المسمطا	Clana	Valaaltu	Canasitu	Description					
To (min)			Velocity	Capacity	Description					
(111111)		\ / <del>f</del> f/ <del>ff</del> \	(ft/coc)	/cfc\						
0.0		<u> </u>	(ft/sec)	(cfs)	Object Flow By MC C					
8.9		· · · · · · · · · · · · · · · · · · ·	(ft/sec) 0.19	(cfs)	Sheet Flow, Pre WS C					
	100	0.1000	0.19	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"					
8.9 2.5	100	0.1000		(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C					
2.5	100 26	0.1000	0.19 1.72	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps					
	100 26	0.1000	0.19	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C					
2.5 1.4	100 26 210	0.1000 0.1187 0.2380	0.19 1.72 2.44	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps					
2.5	100 26 210	0.1000 0.1187 0.2380	0.19 1.72	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C					
2.5 1.4 2.3	100 26 210 240	0.1000 0.1187 0.2380 0.1250	0.19 1.72 2.44 1.77	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps					
2.5 1.4	100 26 210 240	0.1000 0.1187 0.2380 0.1250	0.19 1.72 2.44	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C					
2.5 1.4 2.3 6.9	100 26 210 240 47	0.1000 0.1187 0.2380 0.1250 7 0.0524	0.19 1.72 2.44 1.77 1.14	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps					
2.5 1.4 2.3	100 26 210 240 47	0.1000 0.1187 0.2380 0.1250 0.0524	0.19 1.72 2.44 1.77	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C					
2.5 1.4 2.3 6.9	100 26 210 240 47 46	0.1000 0.1187 0.2380 0.1250 7 0.0524 0.2047	0.19 1.72 2.44 1.77 1.14	(cfs)	Woods: Light underbrush n= 0.400 P2= 5.09"  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Woodland Kv= 5.0 fps  Shallow Concentrated Flow, Pre WS C  Shallow Concentrated Flow, Pre WS C					



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# Summary for Subcatchment C: PRE WS C

Runoff = 14.99 cfs @ 12.36 hrs, Volume=

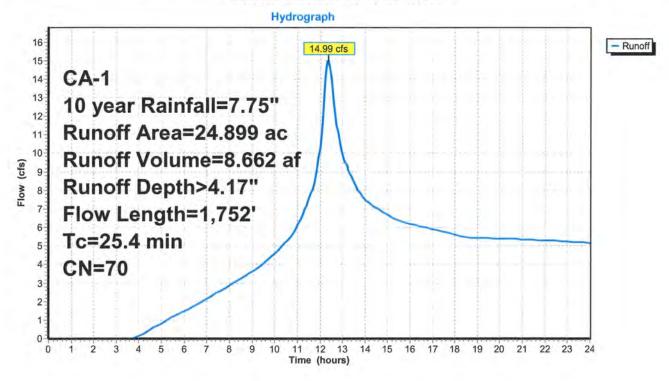
8.662 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 year Rainfall=7.75"

Area	(ac) C	N Desc	cription							
5	.834	30 Woo	ds, Fair, F	ISG B						
12	.216	73 Woo	Woods, Fair, HSG C							
0	.107	56 Brus	Brush, Fair, HSG B							
0	.436	70 Brus	Brush, Fair, HSG C							
1.	.893 (	31 >759	>75% Grass cover, Good, HSG B							
0	.114	74 >75°	>75% Grass cover, Good, HSG C							
0.	.080	39 Pave	ed roads w	/open ditch	nes, 50% imp, HSG B					
0	.117 9	92 Pave	ed roads w	/open ditch	nes, 50% imp, HSG C					
0	.087	98 Root	fs, HSG B							
0	.109	98 Roof	s, HSG C							
			er Surface	•						
* 2	.335 (	31 >75%	% Vineyard	d, Good, H	SG B					
24.	.899	70 Weig	ghted Avei	rage						
	.033	92.5	92.51% Pervious Area							
1.	.865	7.49	% Impervi	ous Area						
_				_						
Tc	Length	Slope	Velocity	Capacity	Description					
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)	The state of the s					
8.9	100	0.1000	0.19		Sheet Flow, Pre WS C					
					Woods: Light underbrush n= 0.400 P2= 5.09"					
2.5	261	0.1187	1.72		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
1.4	210	0.2380	2.44		Shallow Concentrated Flow, Pre WS C					
			4		Woodland Kv= 5.0 fps					
2.3	240	0.1250	1.77		Shallow Concentrated Flow, Pre WS C					
0.0	4	0.0504			Woodland Kv= 5.0 fps					
6.9	477	0.0524	1.14		Shallow Concentrated Flow, Pre WS C					
0.4	40.4	0.0047	0.00		Woodland Kv= 5.0 fps					
3.4	464	0.2047	2.26		Shallow Concentrated Flow, Pre WS C					
	4 =			.41	Woodland Kv= 5.0 fps					
25.4	1,752	Total								

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## Summary for Subcatchment C: PRE WS C

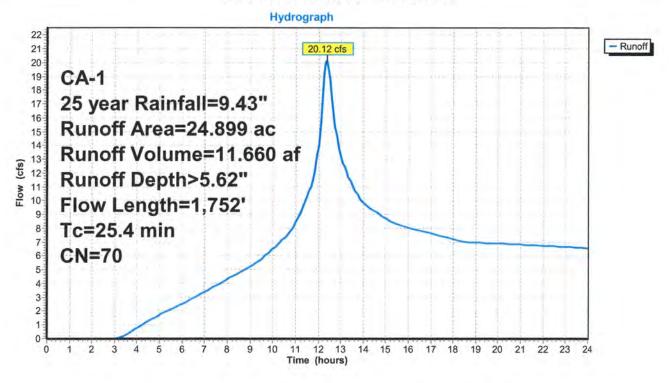
Runoff = 20.12 cfs @ 12.36 hrs, Volume= 11

11.660 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 year Rainfall=9.43"

Area	(ac) C	N Des	cription							
5.	834	30 Woo	Woods, Fair, HSG B							
12.	216	73 Woo	Woods, Fair, HSG C							
0.	107	56 Brus	Brush, Fair, HSG B							
0.	436	70 Brus	Brush, Fair, HSG C							
1.	893		>75% Grass cover, Good, HSG B							
0.	114		>75% Grass cover, Good, HSG C							
0.	080				nes, 50% imp, HSG B					
0.	117				nes, 50% imp, HSG C					
0.	087		fs, HSG B	•	, , , , , , , , , , , , , , , , , , , ,					
0.	109		fs, HSG C							
1.	571	98 Wate	er Surface	, HSG C						
<u>* 2.</u>	335	31 >75°	% Vineyard	d, Good, H	SG B					
24.	899 .	70 Wei	ghted Aver	age						
23.	033	92.5	92.51% Pervious Area							
1.	865	7.49% Impervious Area								
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
8.9	100	0.1000	0.19		Sheet Flow, Pre WS C					
					Woods: Light underbrush n= 0.400 P2= 5.09"					
2.5	261	0.1187	1.72		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
1.4	210	0.2380	2.44		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
2.3	240	0.1250	1.77		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
6.9	477	0.0524	1.14		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
3.4	464	0.2047	2.26		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
25.4	1,752	Total								

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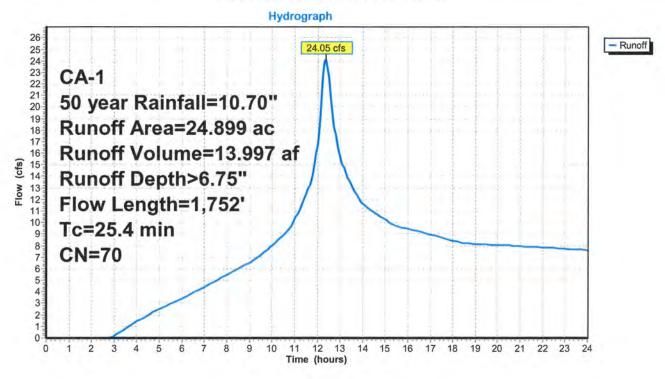
# Summary for Subcatchment C: PRE WS C

Runoff = 24.05 cfs @ 12.36 hrs, Volume=

13.997 af, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 year Rainfall=10.70"

A	rea (	(ac) C	N Desc	cription						
	5.8	834 6	0 Woo	ds, Fair, F	ISG B					
	12.2	216 7	3 Woo	ds, Fair, F	ISG C					
	0.1	107 5	6 Brus	h, Fair, HS	SG B					
	0.4	436 7		h, Fair, HS						
	1.8	893 6	31 >759	>75% Grass cover, Good, HSG B						
	0.1	114 7	4 >75°	>75% Grass cover, Good, HSG C						
	0.0	3 080	89 Pave	ed roads w	/open ditch	nes, 50% imp, HSG B				
	0.1	117 9	2 Pave	ed roads w	/open ditch	nes, 50% imp, HSG C				
	0.0	087 9	98 Root	fs, HSG B						
				fs, HSG C						
				er Surface	•					
*					d, Good, H	SG B				
	24.8		,	ghted Aver	_					
	23.0			92.51% Pervious Area						
	1.8	865	7.49	% Impervi	ous Area					
	<b>-</b> .	I41-	01	Mala 24	0	Described				
(100	Tc	Length	Slope	Velocity	Capacity	Description				
	in)	(feet)	(ft/ft)	(ft/sec)	(cfs)	01 (FI D W0.0				
•	8.9	100	0.1000	0.19		Sheet Flow, Pre WS C				
	0 F	004	0.4407	4.70		Woods: Light underbrush n= 0.400 P2= 5.09"				
	2.5	261	0.1187	1.72		Shallow Concentrated Flow, Pre WS C				
	1.4	210	0.2380	2.44		Woodland Kv= 5.0 fps				
	1.4	210	0.2360	2.44		Shallow Concentrated Flow, Pre WS C Woodland Kv= 5.0 fps				
	2.3	240	0.1250	1.77		Shallow Concentrated Flow, Pre WS C				
•	2.3	240	0.1230	1.77		Woodland Kv= 5.0 fps				
	6.9	477	0.0524	1.14		Shallow Concentrated Flow, Pre WS C				
,	0.9	411	0.0024	1.14		Woodland Kv= 5.0 fps				
	3.4	464	0.2047	2.26		Shallow Concentrated Flow, Pre WS C				
,	J. <del>T</del>	707	0.2077	2.20		Woodland Kv= 5.0 fps				
2	5.4	1,752	Total			TYOUGHT TY CIO IPO				



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# Summary for Subcatchment C: PRE WS C

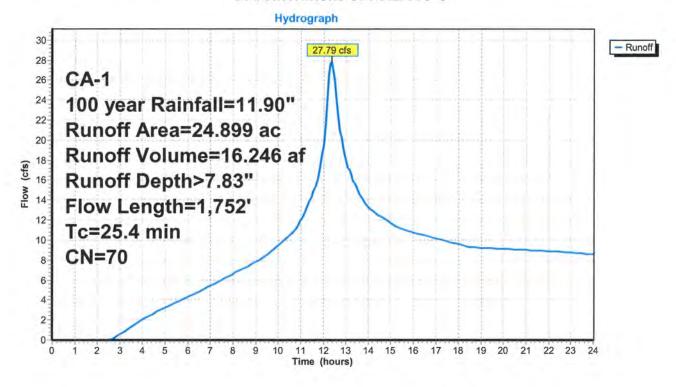
Runoff = 27.79 cfs @ 12.36 hrs, Volume=

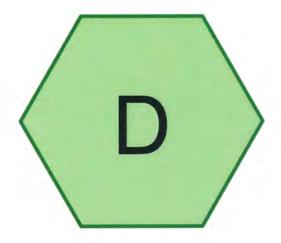
16.246 af, Depth> 7.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 year Rainfall=11.90"

Area	(ac) (	ON Des	cription							
5	.834	60 Woo	ods, Fair, F	ISG B						
12	.216	73 Woo	Woods, Fair, HSG C							
0	.107	56 Brus	Brush, Fair, HSG B							
0	.436	70 Brus	Brush, Fair, HSG C							
1	.893	61 >75	>75% Grass cover, Good, HSG B							
0	.114	74 >75	>75% Grass cover, Good, HSG C							
0	.080	89 Pave	ed roads w	/open ditch	nes, 50% imp, HSG B					
0	.117	92 Pave	ed roads w	/open ditch	nes, 50% imp, HSG C					
0	.087	98 Roo	fs, HSG B							
0	.109	98 Roo	fs, HSG C							
1.	.571	98 Wat	er Surface	, HSG C						
* 2	.335	61 >75°	% Vineyard	d, Good, H	SG B					
24	.899	70 Wei	ghted Avei	rage						
23	.033	92.5	92.51% Pervious Area							
1,	.865	7.49% Impervious Area								
Tc	Length		Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
8.9	100	0.1000	0.19		Sheet Flow, Pre WS C					
					Woods: Light underbrush n= 0.400 P2= 5.09"					
2.5	261	0.1187	1.72		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
1.4	210	0.2380	2.44		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
2.3	240	0.1250	1.77		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
6.9	477	0.0524	1.14		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
3.4	464	0.2047	2.26		Shallow Concentrated Flow, Pre WS C					
					Woodland Kv= 5.0 fps					
25.4	1,752	Total								

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# PRE WS D









Routing Diagram for PRE WS D R1
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#### PRE WS D R1

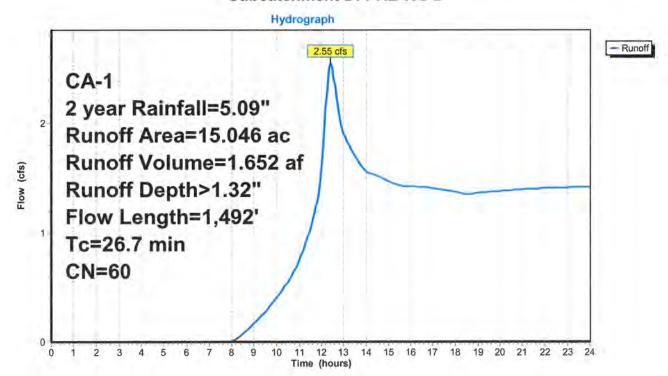
Prepared by Napa Valley Vineyard Engineering
HydroCAD® 10.00-24 s/n 09186 © 2018 HydroCAD Software Solutions LLC

## Summary for Subcatchment D: PRE WS D

Runoff = 2.55 cfs @ 12.41 hrs, Volume= 1.652 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 year Rainfall=5.09"

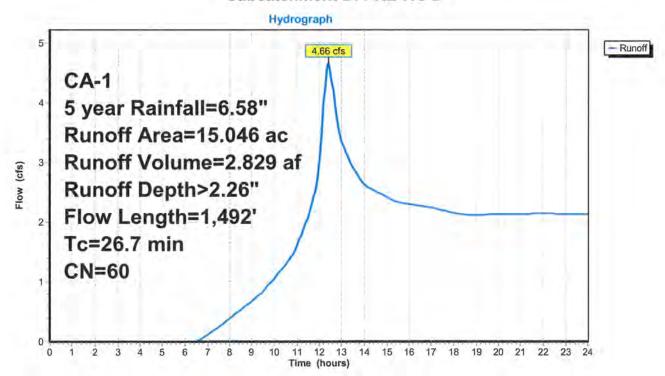
	Area	(ac) C	N Des	cription		
	12.	.607	60 Woo	ods, Fair, F	ISG B	
	0.	310		ds, Fair, F		
	1.	417	56 Brus	sh, Fair, HS	SG B	
k	0.	712	61 >75	% Vineyard	d, Good, HS	SG B
	15.046 60 Weighted				age	
		.046		00% Pervi		
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
-	8.3	100	0.1200	0.20	(013)	Sheet Flow, Pre WS D
	0.0	100	0.1200	0.20		Woods: Light underbrush n= 0.400 P2= 5.09"
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Pre WS D
	0.0	100	0.0100	62.55		Woodland Kv= 5.0 fps
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Pre WS D
	-					Woodland Kv= 5.0 fps
	9.4	593	0.0438	38 1.05		Shallow Concentrated Flow, Pre WS D
		273	17.00	174.5		Woodland Kv= 5.0 fps
7	26.7	1.492	Total			



Runoff = 4.66 cfs @ 12.39 hrs, Volume= 2.829 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 year Rainfall=6.58"

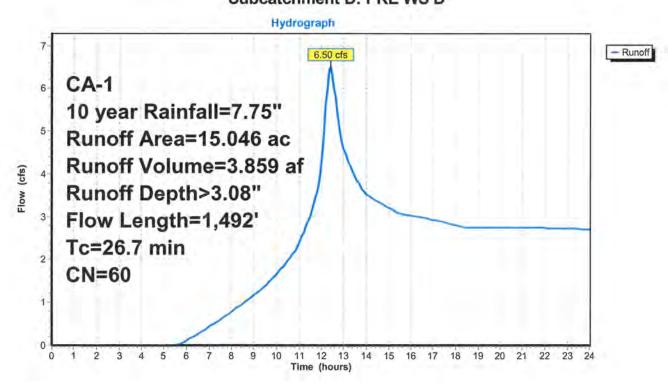
Are	a (ac	) C	N Desc	cription		
	2.60	7 6	0 Woo	ds, Fair, F	ISG B	
	0.310	0 7	3 Woo	ds, Fair, F	ISG C	
	1.41	7 5	6 Brus	h, Fair, HS	SG B	
	0.712	2 6	1 >759	% Vineyard	d, Good, HS	SG B
	5.046	6 6	0 Wei	hted Aver	age	
	15.046		100.00% Pervious Area			
Т	c Le	ength	Slope	Velocity	Capacity	Description
(mir		(feet)	(ft/ft)	(ft/sec)	(cfs)	Document
8.	3	100	0.1200	0.20		Sheet Flow, Pre WS D
			1 25.35			Woods: Light underbrush n= 0.400 P2= 5.09"
6.	9	463	0.0496	1.11		Shallow Concentrated Flow, Pre WS D
						Woodland Kv= 5.0 fps
2.	1	336	0.2827	2.66		Shallow Concentrated Flow, Pre WS D
						Woodland Kv= 5.0 fps
9.	9.4		593 0.0438	1.05	05	Shallow Concentrated Flow, Pre WS D
						Woodland Kv= 5.0 fps
26	7 '	1 492	Total			



Runoff = 6.50 cfs @ 12.39 hrs, Volume= 3.859 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 year Rainfall=7.75"

	Area	(ac)	CN Des	cription		
	12.	607	60 Woo	ods, Fair, F	ISG B	
	0.	310	73 Woo	ods, Fair, F	ISG C	
	1.	417	56 Brus	sh, Fair, HS	SG B	
k	0.	712			d, Good, HS	SG B
	15.046 60 Weighted Average					
	15.046			.00% Pervi		
	Tc (min)	Length (feet)	The state of the s	Velocity (ft/sec)	Capacity (cfs)	Description
	8.3	100		0.20	1007	Sheet Flow, Pre WS D Woods: Light underbrush n= 0.400 P2= 5.09"
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps
	26.7	1.492	Total			

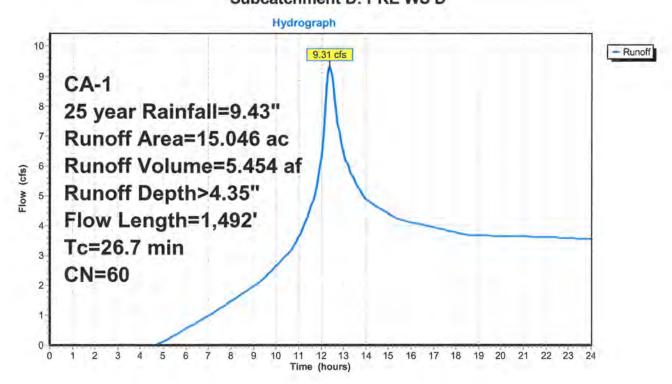


Runoff 9.31 cfs @ 12.38 hrs, Volume= 5.454 af, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 year Rainfall=9.43"

	Area	(ac) (	ON Des	cription		
	12.	607	60 Woo	ds, Fair, F	ISG B	
	0.			ds, Fair, F		
				h, Fair, HS		
k	0.				Good, HS	SG B
	7.7			ghted Aver		
		046		100.00% Pervious Area		
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description
	8.3	100	The Contract of	0.20	(013)	Sheet Flow, Pre WS D
	0.0	100	0.1200	0.20		Woods: Light underbrush n= 0.400 P2= 5.09"
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Pre WS D
		107				Woodland Kv= 5.0 fps
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Pre WS D
						Woodland Kv= 5.0 fps
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Pre WS D
						Woodland Kv= 5.0 fps
	26.7	1,492	Total			

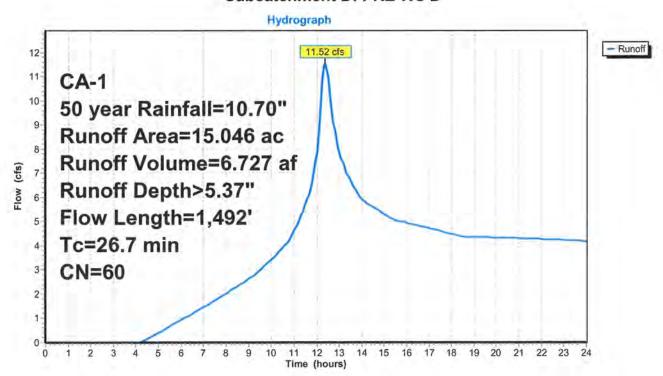
#### 1,492 lotal



Runoff = 11.52 cfs @ 12.38 hrs, Volume= 6.727 af, Depth> 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 year Rainfall=10.70"

Area	(ac) (	CN Des	cription						
12.	.607	60 Woo	ds, Fair, F	ISG B					
0.	310	73 Woo	ods, Fair, F	ISG C					
1.	417	56 Brus	sh, Fair, HS	SG B					
0.	712		>75% Vineyard, Good, HSG B						
15.046 60 Weighted Average									
	.046		00.00% Pervious Area						
Tc	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)		(ft/sec)	(cfs)	The state of the s				
8.3	100	0.1200	0.20		Sheet Flow, Pre WS D Woods: Light underbrush n= 0.400 P2= 5.09"				
6.9	463	0.0496	1.11		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps				
2.1	336	0.2827	2.66		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps				
9.4	593	0.0438	1.05		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps				
26.7	1,492	Total							

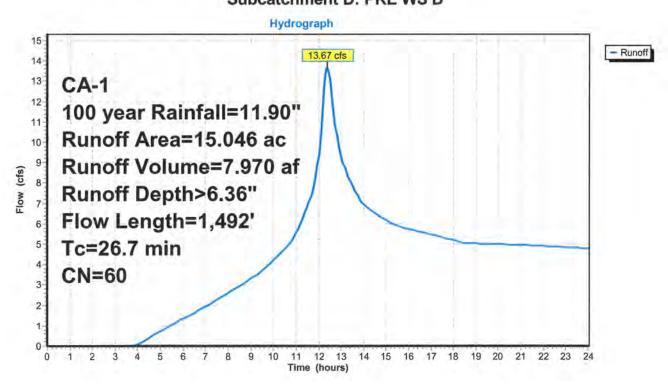


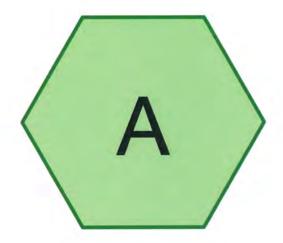
## Summary for Subcatchment D: PRE WS D

Runoff = 13.67 cfs @ 12.38 hrs, Volume= 7.970 af, Depth> 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 year Rainfall=11.90"

	Area	(ac) C	ON Des	cription		
1	12.	607	60 Woo	ods, Fair, F	ISG B	
	0.	0.310 73		ods, Fair, F		
	1.	417	56 Brus	sh, Fair, HS	SG B	
+	0.	712			d, Good, HS	SG B
	15.	046	60 Wei	ghted Ave	rage	
		046		00% Pervi		
	Tc	Length	the same of the same of the same of	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	8.3	100	0.1200	0.20		Sheet Flow, Pre WS D Woods: Light underbrush n= 0.400 P2= 5.09"
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Pre WS D Woodland Kv= 5.0 fps
	26.7	1,492	Total			





## POST WS A









Routing Diagram for POST WS A R1
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## Summary for Subcatchment A: POST WS A

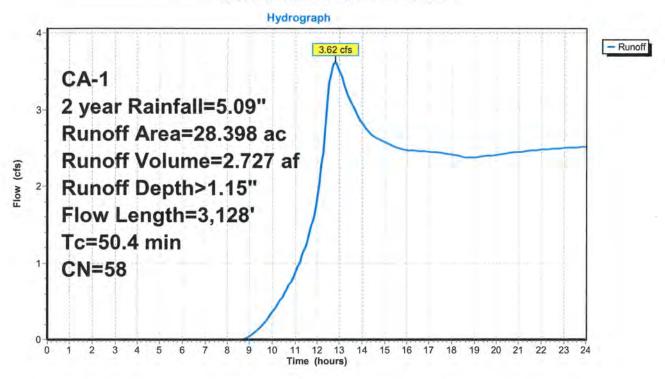
Runoff = 3.62 cfs @ 12.79 hrs, Volume=

2.727 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 year Rainfall=5.09"

	Area	(ac)(	N Des	cription					
-	18.	240	55 Woo	ods, Good,	HSG B				
	1.			ods, Good,					
	1.	120		sh, Good, Î					
	0.	202	61 >75°	% Grass c	, HSG B				
	1.248 74 >75% Grass cover, Good, HSG C								
	0.124 85 Gravel roads, HSG B								
	0.115 89 Gravel roads, HSG C								
*	* 5.451 61 >75% Vineyard, Good, HSG B								
*	0.	690	75 >75°	% Vineyar	d, Good, H	SG C			
	28.398 58 Weighted Average								
	28.	398	100.	00% Pervi	ous Area				
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	7.4	100	0.1600	0.22		Sheet Flow, Post WS A			
						Woods: Light underbrush n= 0.400 P2= 5.09"			
	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
	37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
	50.4	3,128	Total						

Prepared by Napa Valley Vineyard Engineering
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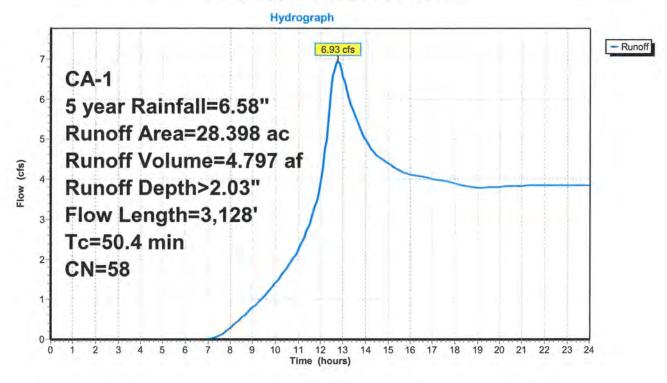
## Summary for Subcatchment A: POST WS A

Runoff = 6.93 cfs @ 12.74 hrs, Volume=

4.797 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 year Rainfall=6.58"

Α	rea (a	ic)C	N Desc	cription					
	18.2	40 5	5 Woo	ds, Good,	HSG B				
	1.2	08 7	'0 Woo	ds, Good,	HSG C				
	1.1.	20 4	8 Brus	h, Good, I	HSG B				
	0.2	02 6	31 >75%	% Grass c	over, Good	, HSG B			
	1.2	48 7	'4 >75 <sup>9</sup>	% Grass co	over, Good	, HSG C			
	0.1	24 8	5 Grav	el roads, l	HSG B				
	0.1	15 8	9 Grav	Gravel roads, HSG C					
*	5.4	51 6	31 <b>&gt;</b> 75%	>75% Vineyard, Good, HSG B					
*	0.6	90 7	'5 >75°	√ Vineyard	d, Good, H	SG C			
	28.398 58 Weighted Average								
	28.3	98	100.	00% Pervi	ous Area				
	Tc I	Length	Slope	Velocity	Capacity	Description			
(m	in)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
-	7.4	100	0.1600	0.22		Sheet Flow, Post WS A			
						Woods: Light underbrush n= 0.400 P2= 5.09"			
2	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
;	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
37	7.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
50	0.4	3.128	Total						



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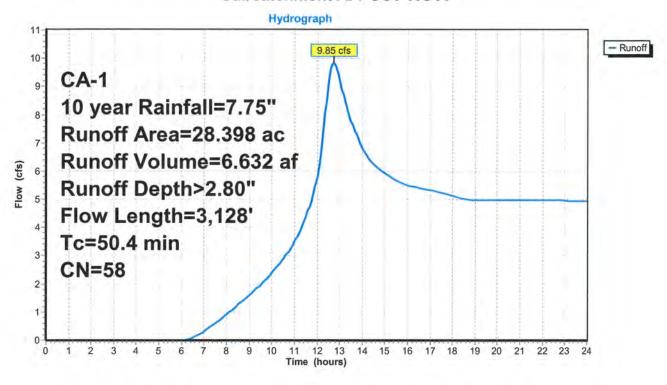
## **Summary for Subcatchment A: POST WS A**

Runoff = 9.85 cfs @ 12.72 hrs, Volume=

6.632 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 year Rainfall=7.75"

		, , ,							
_	Area	(ac)(	N Des	cription					
	18.	240	55 Woo	ds, Good,	HSG B				
	1.	208	70 Woo	ods, Good,	HSG C				
				sh, Good, I					
					over, Good	HSG B			
					over, Good over, Good				
						, nse c			
	0.124 85 Gravel roads, HSG B								
	0.115 89 Gravel roads, HSG C								
*				•	d, Good, H				
*	0.	690	75 <u>&gt;75</u>	% Vineyar	d, Good, H	SG C			
	28.398 58 Weighted Average								
		398	,	00% Pervi	~				
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•			
	7.4	100	0.1600	0.22	· · · · · · · · · · · · · · · · · · ·	Sheet Flow, Post WS A			
	• • •	100	0.1000	0.22		Woods: Light underbrush n= 0.400 P2= 5.09"			
	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Post WS A			
	۷.۱	104	0.0615	1.43					
		000	0.0000	0.00		Woodland Kv= 5.0 fps			
	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
	37.2	2,211	1 0.0393 0.99			Shallow Concentrated Flow, Post WS A			
						Woodland Kv= 5.0 fps			
	50.4	3.128	Total						



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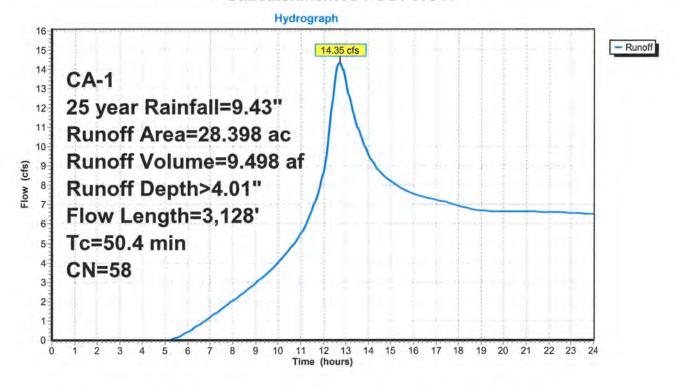
## Summary for Subcatchment A: POST WS A

Runoff = 14.35 cfs @ 12.71 hrs, Volume=

9.498 af, Depth> 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 year Rainfall=9.43"

	_							
	Area	(ac) (	N Des	cription				
	18.	240	55 Woo	ds, Good,	HSG B			
	1.	208		ds, Good,				
				h, Good, l				
	0.202 61 >75% Grass cover, Good, HSG B							
	1.248 74 >75% Grass cover, Good, HSG C							
	0.124 85 Gravel roads, HSG B							
	0.115 89 Gravel roads, HSG C							
	* 5.451 61 >75% Vineyard, Good, HSG B							
*	0.	690	75 >75°	% Vineyard	d, Good, H	SG C		
	28.398 58 Weighted Average							
	28.	398	100.	00% Pervi	ous Area			
	Tc	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	_ ••••··		
	7.4	100		0.22	(0.0)	Sheet Flow, Post WS A		
	7.7	100	0.1000	0.22		Woods: Light underbrush n= 0.400 P2= 5.09"		
	2.4	101	0.0015	1 12				
	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	37.2	2,211	11 0.0393 0.99			Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	50.4	3,128	Total			**		



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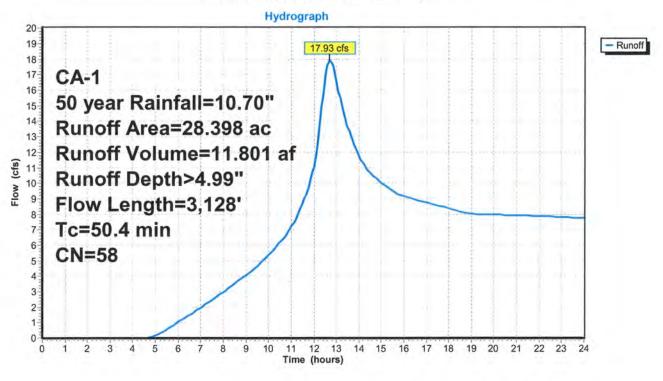
## Summary for Subcatchment A: POST WS A

Runoff = 17.93 cfs @ 12.71 hrs, Volume=

11.801 af, Depth> 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 year Rainfall=10.70"

	Area	(ac) (	ON Des	cription				
	18.	240	55 Wo	ods, Good,	HSG B			
	1.	208	70 Wo	ods, Good,	HSG C			
	1.	120	48 Brus	sh, Good, I	HSG B			
	0.	202	61 >75	% Grass c	over, Good	, HSG B		
	1.248 74 >75% Grass cover, Good, HSG C							
	0.124 85 Gravel roads, HSG B							
	0.	115		vel roads, l				
*	5.	451			d, Good, H			
*	0.	690	75 >75	% Vineyard	d, Good, H	SG C		
	28.398 58 Weighted Average							
	28.	398	100	.00% Pervi	ous Area			
	Тс	Length	•		Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	7.4	100	0.1600	0.22		Sheet Flow, Post WS A		
						Woods: Light underbrush n= 0.400 P2= 5.09"		
	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Post WS A		
_		<del></del>				Woodland Kv= 5.0 fps		
	50.4	3,128	Total					



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## Summary for Subcatchment A: POST WS A

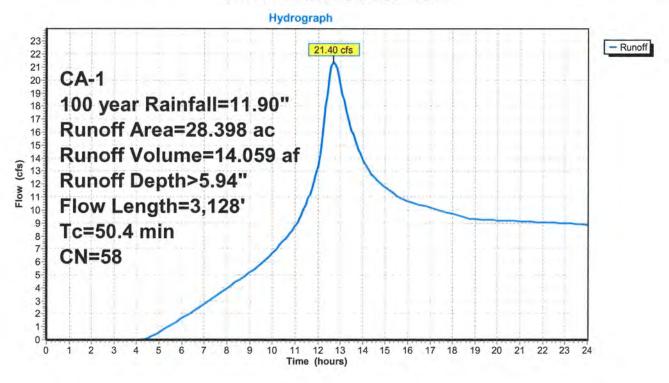
Runoff = 21.40 cfs @ 12.70 hrs, Volume=

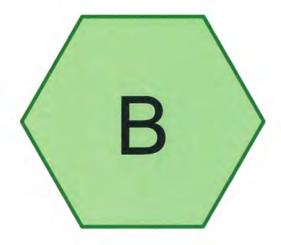
14.059 af, Depth> 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 year Rainfall=11.90"

	Area	(ac) (	ON Des	cription				
	18.	240	55 Woo	ds, Good,	HSG B			
	1.	208	70 Woo	ods, Good,	HSG C			
	1.	120	48 Brus	sh, Good, I	HSG B			
	0.	202	61 >75	, HSG B				
	1.248 74 >75% Grass cover, Good, HSG C							
	0.124 85 Gravel roads, HSG B							
	0.	115	89 Grav	/el roads, l	HSG C			
*	5.	451	61 >75	% Vineyard	d, Good, HS	SG B		
*	0.	690	75 >75°	% Vineyard	d, Good, H	SG C		
	28.398 58 Weighted Average							
	28.398 100.00% Pervious Area							
	Tc	Length	•	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	7.4	100	0.1600	0.22		Sheet Flow, Post WS A		
						Woods: Light underbrush n= 0.400 P2= 5.09"		
	2.1	184	0.0815	1.43		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	3.7	633	0.3333	2.89		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	37.2	2,211	0.0393	0.99		Shallow Concentrated Flow, Post WS A		
						Woodland Kv= 5.0 fps		
	50.4	3,128	Total					

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## POST WS B







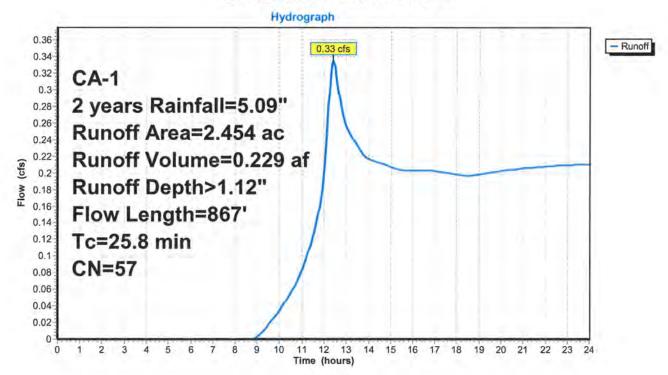


## Summary for Subcatchment B: POST WS B

Runoff = 0.33 cfs @ 12.40 hrs, Volume= 0.229 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 years Rainfall=5.09"

	Area	(ac)	CN E	Desc	ription		
1.288 55 Woods, Good, HSG B							
	0.	080	48 E	Brus	h, Good, h	ISG B	
*	1.	086	61 >	75%	6 Vineyard	d, Good, HS	SG B
		454			hted Aver		
	2.	454	1	00.	00% Pervi	ous Area	
	Tc (min)	Length (feet		pe /ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	11.2	100	0.06	00	0.15		Sheet Flow, Post WS B Grass: Bermuda n= 0.410 P2= 5.09"
	0.4	66	0.19	69	3.11		Shallow Concentrated Flow, Post WS B Short Grass Pasture Kv= 7.0 fps
	14.2	701	0.02	71	0.82		Shallow Concentrated Flow, Post WS B Woodland Kv= 5.0 fps
	25.8	867	Tota	1			



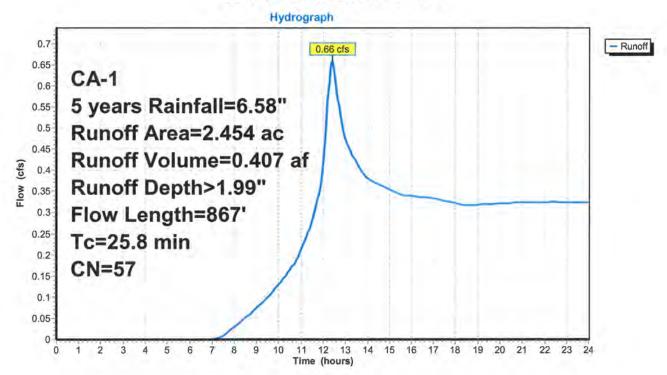
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## Summary for Subcatchment B: POST WS B

Runoff = 0.66 cfs @ 12.39 hrs, Volume= 0.407 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 years Rainfall=6.58"

	Area (ac)		ON Des	cription					
9	1.	288		Woods, Good, HSG B					
	0.	080		sh, Good, I					
*	1.	1.086 61		>75% Vineyard, Good, HSG B					
	2.	454	57 Wei	ghted Ave	rage				
	2.454 100.00% Pervious Area								
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	11.2	100	0.0600	0.15		Sheet Flow, Post WS B Grass: Bermuda n= 0.410 P2= 5.09"			
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Post WS B Short Grass Pasture Kv= 7.0 fps			
Ļ	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Post WS B Woodland Kv= 5.0 fps			
	25.8	867	Total						

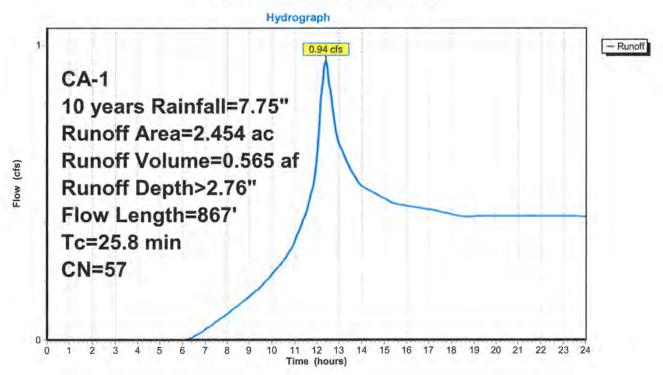


## Summary for Subcatchment B: POST WS B

Runoff = 0.94 cfs @ 12.38 hrs, Volume= 0.565 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 years Rainfall=7.75"

	Area	(ac) (	ON Des	cription						
	1.	.288	55 Woo	ods, Good,	HSG B					
0.080 48 Brush, Good, HSG B										
*	1.	.086	61 >75	>75% Vineyard, Good, HSG B						
1	2	.454	57 Wei	ghted Ave	rage					
		454		100.00% Pervious Area						
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description				
	11.2	100	0.0600	0.15		Sheet Flow, Post WS B Grass: Bermuda n= 0.410 P2= 5.09"				
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Post WS B Short Grass Pasture Kv= 7.0 fps				
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Post WS B Woodland Kv= 5.0 fps				
	25.8	867	Total							

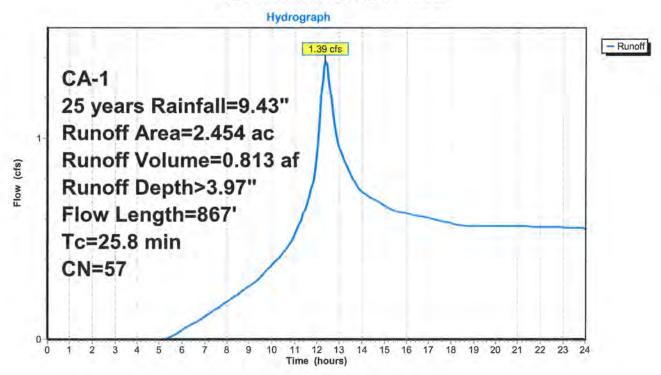


## Summary for Subcatchment B: POST WS B

Runoff = 1.39 cfs @ 12.37 hrs, Volume= 0.813 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 years Rainfall=9.43"

	Area	(ac) C	ON Des	cription		
Ŧ	1.	288	55 Woo	ods, Good,	HSG B	
	0.	.080	48 Brus	sh, Good, I	HSG B	
*	1.	.086	61 >75	% Vineyard	d, Good, HS	SG B
	2.	454	57 Wei	ghted Aver	rage	
	2.	454	100.	00% Pervi	ous Area	
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	11.2	100	0.0600	0.15		Sheet Flow, Post WS B Grass: Bermuda n= 0.410 P2= 5.09"
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Post WS B Short Grass Pasture Kv= 7.0 fps
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Post WS B Woodland Kv= 5.0 fps
	25.8	867	Total			



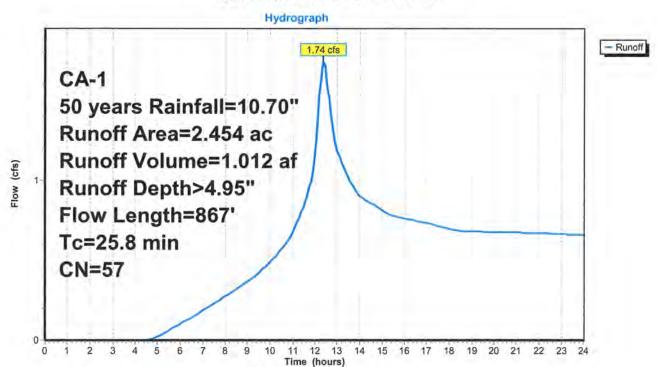
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## Summary for Subcatchment B: POST WS B

Runoff = 1.74 cfs @ 12.37 hrs, Volume= 1.012 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 years Rainfall=10.70"

	Area	(ac)	CN	Desc	cription				
*	1.288 0.080 1.086		55 48 61	Brus	ds, Good, h, Good, h % Vineyard		SG B		
	2.454 2.454		57	Weighted Average 100.00% Pervious Area					
1	Tc (min)	Length (feet		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	11.2	100	0.	.0600	0.15		Sheet Flow, Post WS B Grass: Bermuda n= 0.410 P2= 5.09"		
	0.4	66	0.	1969	3.11		Shallow Concentrated Flow, Post WS B Short Grass Pasture Ky= 7.0 fps		
	14.2	701	0.	.0271	0.82		Shallow Concentrated Flow, Post WS B Woodland Kv= 5.0 fps		
	25.8	867	To	otal					



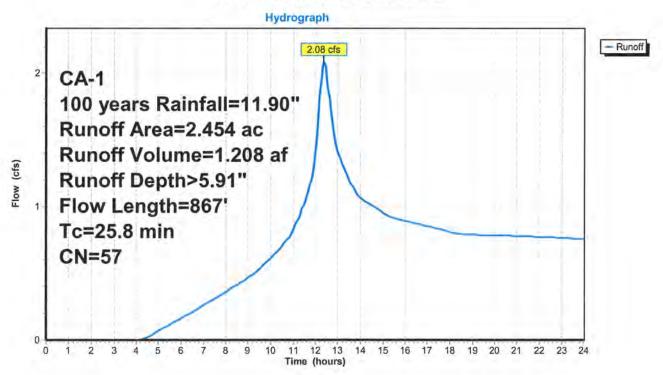
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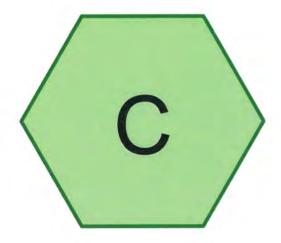
## Summary for Subcatchment B: POST WS B

Runoff = 2.08 cfs @ 12.37 hrs, Volume= 1.208 af, Depth> 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 years Rainfall=11.90"

	Area	(ac) C	N Des	cription		
	0.	080	48 Brus	ods, Good, sh, Good, I % Vineyard		SG B
	71.77	454 454		ghted Aver 00% Pervi		
(	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	11.2	100	0.0600	0.15		Sheet Flow, Post WS B Grass: Bermuda n= 0.410 P2= 5.09"
	0.4	66	0.1969	3.11		Shallow Concentrated Flow, Post WS B Short Grass Pasture Kv= 7.0 fps
	14.2	701	0.0271	0.82		Shallow Concentrated Flow, Post WS B Woodland Kv= 5.0 fps
	25.8	867	Total			





## POST WS C









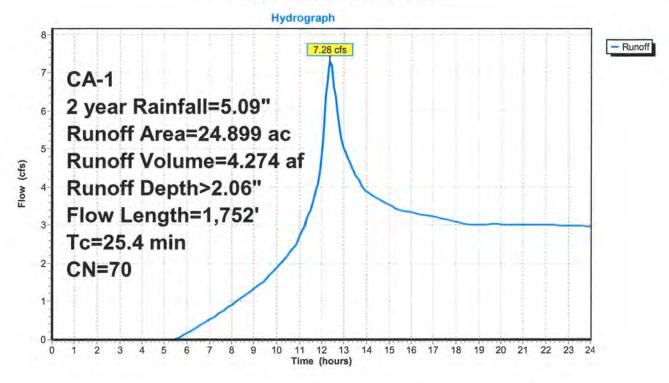
## Summary for Subcatchment C: POST WS C

Runoff = 7.28 cfs @ 12.37 hrs, Volume= 4.

4.274 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 year Rainfall=5.09"

_	Area	(ac) (	ON Des	cription				
	2.	.399						
	0.	.068						
		.436 .542						
	0. 0.	I, HSG B						
	I, HSG C							
					•	nes, 50% imp, HSG B		
					//open ditch	nes, 50% imp, HSG C		
				fs, HSG B				
				fs, HSG C				
*				er Surface	d, Good, H	CC B		
*					d, Good, H			
_				ghted Ave				
		033	_	1% Pervio	_			
		865		7.49% Impervious Area				
	• •	000	7.70	70 IIIIporti	04071104			
	Tc	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	The state of the s		
-	8.9	100	0.1000	0.19		Sheet Flow, Post WS C		
						Woods: Light underbrush n= 0.400 P2= 5.09"		
	2.5	261	0.1187	1.72		Shallow Concentrated Flow, Post WS C		
						Woodland Kv= 5.0 fps		
	1.4	210	0.2380	2.44		Shallow Concentrated Flow, Post WS C		
						Woodland Kv= 5.0 fps		
	2.3	240	0.1250	1.77		Shallow Concentrated Flow, Post WS C		
						Woodland Kv= 5.0 fps		
	6.9	477	0.0524	1.14		Shallow Concentrated Flow, Post WS C		
	0.4	404	0.0047	0.00		Woodland Kv= 5.0 fps		
	3.4	464	0.2047	2.26		Shallow Concentrated Flow, Post WS C		
_		4 755	<del></del>			Woodland Kv= 5.0 fps		
	25.4	1,752	Total					



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## Summary for Subcatchment C: POST WS C

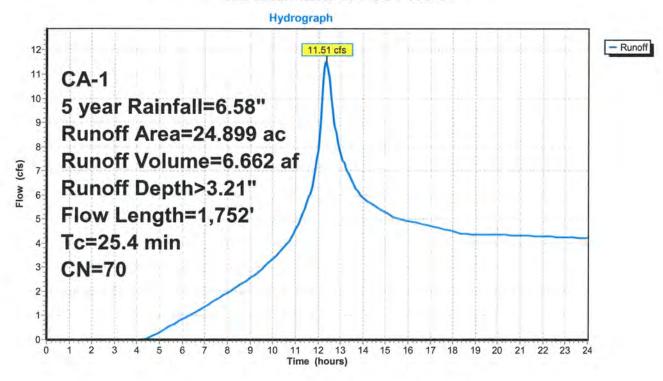
Runoff = 11.51 cfs @ 12.37 hrs, Volume=

6.662 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 year Rainfall=6.58"

	Area	(ac) C	ON Des	cription		
	2.	399	60 Woo	ods, Fair, F	ISG B	
	11.	329	73 Woo	ods, Fair, F	HSG C	
	0.	068	56 Brus	sh, Fair, H	SG B	
	0.	436	70 Brus	sh, Fair, H	SG C	
					over, Good	
					over, Good	
						nes, 50% imp, HSG B
					//open ditch	nes, 50% imp, HSG C
				fs, HSG B		
				fs, HSG C		
*				er Surface	•	
*				•	d, Good, H	
					d, Good, H	3G C
	24.899 70 Weighted Average 23.033 92.51% Pervious Area					
		033 865		2.31% Fervious Area  2.49% Impervious Area		
	١.	000	1.43			
	Тс	Length	Slope	Velocity	Capacity	Description
(	min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	Doodilphon
	8.9	100	0.1000	0.19		Sheet Flow, Post WS C
	-,-					Woods: Light underbrush n= 0.400 P2= 5.09"
	2.5	261	0.1187	1.72		Shallow Concentrated Flow, Post WS C
						Woodland Kv= 5.0 fps
	1.4	210	0.2380	2.44		Shallow Concentrated Flow, Post WS C
						Woodland Kv= 5.0 fps
	2.3	240	0.1250	1.77		Shallow Concentrated Flow, Post WS C
						Woodland Kv= 5.0 fps
	6.9	477	0.0524	1.14		Shallow Concentrated Flow, Post WS C
						Woodland Kv= 5.0 fps
	3.4	464	0.2047	2.26		Shallow Concentrated Flow, Post WS C
						Woodland Kv= 5.0 fps
	25.4	1,752	Total			

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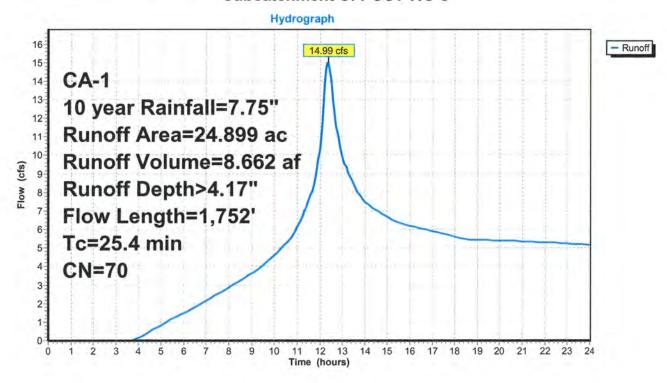
## Summary for Subcatchment C: POST WS C

Runoff = 14.99 cfs @ 12.36 hrs, Volume=

8.662 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 year Rainfall=7.75"

Ar	ea (a	ac) C	N Desc	cription					
	2.399 60 Woods, Fair, HSG B								
	11.329 73 Woods, Fair, HSG C 0.068 56 Brush, Fair, HSG B								
	, HSG B								
0.542 61 >75% Grass cover, Good, HSG B 0.107 74 >75% Grass cover, Good, HSG C									
	0.0	80 080	9 Pave	ed roads w	/open ditch	nes, 50% imp, HSG B			
	0.1			ed roads w	/open ditch	nes, 50% imp, HSG C			
	0.0			fs, HSG B					
	0.1			fs, HSG C					
	1.5			er Surface	•				
*	7.1			•	d, Good, HS				
*	0.8				d, Good, HS	SG C			
	24.8		,	ghted Aver	•				
	23.0			2.51% Pervious Area					
	1.8	865	7.49	7.49% Impervious A					
	Тс	Length	Slope	Velocity	Capacity	Description			
(mi		(feet)	(ft/ft)	(ft/sec)	(cfs)				
8	3.9	100	0.1000	0.19	•	Sheet Flow, Post WS C			
						Woods: Light underbrush n= 0.400 P2= 5.09"			
2	2.5	261	0.1187	1.72		Shallow Concentrated Flow, Post WS C			
						Woodland Kv= 5.0 fps			
1	.4	210	0.2380	2.44		Shallow Concentrated Flow, Post WS C			
						Woodland Kv= 5.0 fps			
2	2.3	240	0.1250	1.77		Shallow Concentrated Flow, Post WS C			
						Woodland Kv= 5.0 fps			
6	6.9	477	0.0524	1.14		Shallow Concentrated Flow, Post WS C			
						Woodland Kv= 5.0 fps			
3	3.4	464	0.2047	2.26		Shallow Concentrated Flow, Post WS C			
				W. A		Woodland Kv= 5.0 fps			
25	5.4	1,752	Total						



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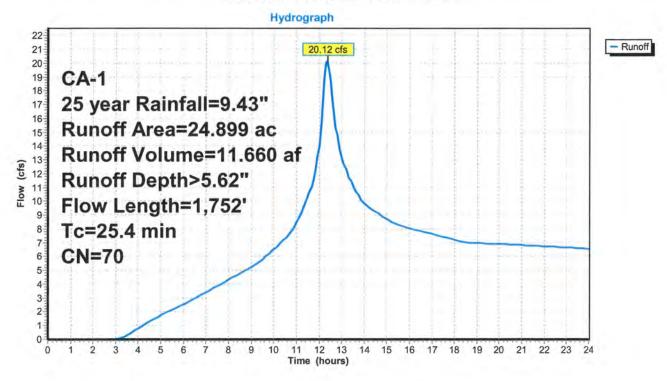
## Summary for Subcatchment C: POST WS C

Runoff = 20.12 cfs @ 12.36 hrs, Volume= 11.660 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 year Rainfall=9.43"

Area	(ac) C	N Desc	cription							
2	.399 (	30 Woo	ds, Fair, F	ISG B						
11	.329	73 Woo	Woods, Fair, HSG C							
0	.068	56 Brus	Brush, Fair, HSG B							
			>75% Grass cover, Good, HSG B							
			>75% Grass cover, Good, HSG C							
			, , , , , , , , , , , , , , , , , , , ,							
			Paved roads w/open ditches, 50% imp, HSG C							
			fs, HSG B							
			fs, HSG C							
			er Surface	•	OC P					
				d, Good, Hi d, Good, Hi						
					<u> </u>					
	.033		ghted Aver 1% Pervio							
	.865		7.49% Impervious Area							
Į.	.000	7.40	70 IIIIpei Vii	ous Alea						
Tc	Length	Slope	Velocity	Capacity	Description					
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
8.9	100	0.1000	0.19		Sheet Flow, Post WS C					
-					Woods: Light underbrush n= 0.400 P2= 5.09"					
2.5	261	0.1187	1.72		Shallow Concentrated Flow, Post WS C					
					Woodland Kv= 5.0 fps					
1.4	210	0.2380	2.44		Shallow Concentrated Flow, Post WS C					
					Woodland Kv= 5.0 fps					
2.3	240	0.1250	1.77		Shallow Concentrated Flow, Post WS C					
					Woodland Kv= 5.0 fps					
6.9	477	0.0524	1.14		Shallow Concentrated Flow, Post WS C					
0.4	40.4	0.0047	0.00		Woodland Kv= 5.0 fps					
3.4	464	0.2047	2.26		Shallow Concentrated Flow, Post WS C					
	4 750	<del>-</del>			Woodland Kv= 5.0 fps					
25.4	1,752	Total								

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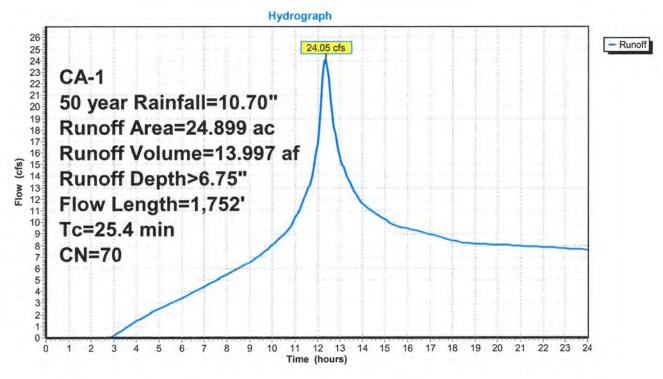
## Summary for Subcatchment C: POST WS C

Runoff = 24.05 cfs @ 12.36 hrs, Volume=

13.997 af, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 year Rainfall=10.70"

	Area	(ac)	CN	Desc	cription					
	2.	399								
	11.	11.329 73 Woods, Fair, HSG C 0.068 56 Brush, Fair, HSG B								
	0.									
	0.	436								
	0.	542	61	>759	% Grass c	over, Good	, HSG B			
	0.	107	74	>759	% Grass c	cover, Good, HSG C				
	0.	080	89				nes, 50% imp, HSG B			
	0.	117	92	Pave	Paved roads w/open ditches, 50% imp, HSG C					
	0.	087	98	Root	fs, HSG B					
	0.	109	98	Root	fs, HSG C					
	1.	571	98	Wate	er Surface	, HSG C				
*	7.	160	61		•	d, Good, H				
*	0.	894	75	>759	% Vineyard	d, Good, H	SG C			
	24.	899	70		ghted Aver					
	23.	033		92.5	92.51% Pervious Area					
	1.	865		7.49	% Impervi	ous Area				
	т.	l <b>4</b> 1-		21	\/=l===!t	0	Description			
1.		Length		Slope	Velocity	Capacity	Description			
	min)	(feet		(ft/ft)	(ft/sec)	(cfs)	OL 151 D 1800			
	8.9	100	0.	1000	0.19		Sheet Flow, Post WS C			
	۰.	004		4407	4.70		Woods: Light underbrush n= 0.400 P2= 5.09"			
	2.5	261	Ι Ο.	1187	1.72		Shallow Concentrated Flow, Post WS C			
	4 4	24.0		2200	0.44		Woodland Kv= 5.0 fps			
	1.4	210	<i>)</i> 0.	2380	2.44		Shallow Concentrated Flow, Post WS C			
	0.0	0.40		1050	4 77		Woodland Kv= 5.0 fps			
	2.3	240	0.	1250	1.77		Shallow Concentrated Flow, Post WS C			
	6.0	477	7 0	0524	1.14		Woodland Kv= 5.0 fps			
	6.9	477	U.	.0524	1.14		Shallow Concentrated Flow, Post WS C			
	2.4	464		2047	2.26		Woodland Kv= 5.0 fps			
	3.4	464	٠ 0.	2047	2.26		Shallow Concentrated Flow, Post WS C			
	25.4	4 750	<del></del>	-4-1			Woodland Kv= 5.0 fps			
-	25.4	1,752	1 (	otal						



## Summary for Subcatchment C: POST WS C

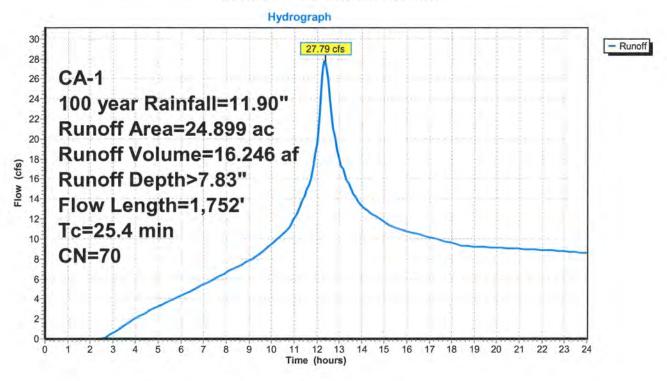
Runoff = 27.79 cfs @ 12.36 hrs, Volume=

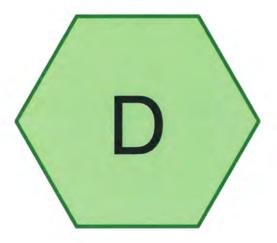
16.246 af, Depth> 7.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 year Rainfall=11.90"

	\rea	(ac)	ac) CN Description								
	2.399 60 Woods, Fair, HSG B										
	11.	329	73	Woo	ds, Fair, F	ISG C					
	0.	068	56	Brus	Brush, Fair, HSG B						
	0.	436	70	Brush, Fair, HSG C							
	0.	542	61	>75% Grass cover, Good, HSG B							
	0.	107	74	>75% Grass cover, Good, HSG C							
	0.	080	89	Pave	Paved roads w/open ditches, 50% imp, HSG B						
		117	92	Pave	ed roads w	/open ditch	es, 50% imp, HSG C				
		087	98		fs, HSG B						
		109	98		fs, HSG C						
		571	98		er Surface	•					
*		160	61			d, Good, HS					
*		894	75			d, Good, HS	SG C				
		899	70		ghted Aver						
		033		92.51% Pervious Area							
	1.	865		7.49% Impervious Area							
	Тс	Length	າ 5	Slope	Velocity	Capacity	Description				
(n	nin)	(feet	)	(ft/ft)	(ft/sec)	(cfs)					
	8.9	100	0.	1000	0.19		Sheet Flow, Post WS C				
							Woods: Light underbrush n= 0.400 P2= 5.09"				
	2.5	261	0.	1187	1.72		Shallow Concentrated Flow, Post WS C				
							Woodland Kv= 5.0 fps				
	1.4	210	0.2	2380	2.44		Shallow Concentrated Flow, Post WS C				
							Woodland Kv= 5.0 fps				
	2.3	240	0.	1250	1.77		Shallow Concentrated Flow, Post WS C				
							Woodland Kv= 5.0 fps				
	6.9	477	7 0.	0524	1.14		Shallow Concentrated Flow, Post WS C				
							Woodland Kv= 5.0 fps				
	3.4	464	0	2047	2.26		Shallow Concentrated Flow, Post WS C				
							Woodland Kv= 5.0 fps				
2	25.4	1,752	2 To	otal							

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# POST WS D









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## Summary for Subcatchment D: POST WS D

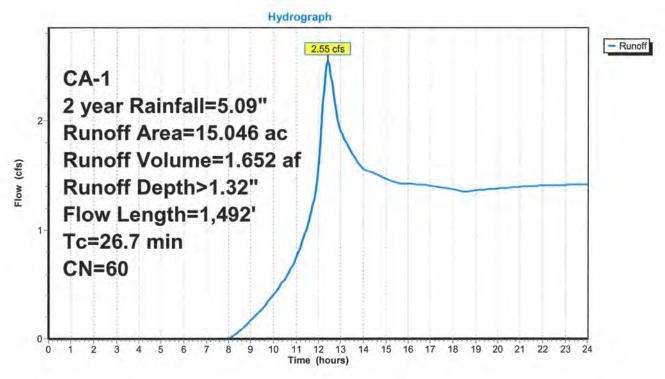
Runoff = 2.55 cfs @ 12.41 hrs, Volume=

1.652 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 2 year Rainfall=5.09"

	Area	(ac) C	ON Des	cription				
	10.678 60 Woods, Fair, HSG B							
	0.047 73 Woods, Fair, HSG C							
	1.417 56 Brush, Fair, HSG B							
*	* 2.641 61 >75% Vineyard, Good, HSG B							
*	0.	263	75 >75°	% Vineyard	d, Good, HS	SG C		
	15.	046	60 Wei	ghted Aver	age			
	15.	046	100.	00% Pervi	ous Area			
	Тс	Length		Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	8.3	100	0.1200	0.20		Sheet Flow, Post WS D		
						Woods: Light underbrush n= 0.400 P2= 5.09"		
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Post WS D		
						Woodland Kv= 5.0 fps		
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Post WS D		
						Woodland Kv= 5.0 fps		
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Post WS D		
						Woodland Kv= 5.0 fps		
	26.7	1,492	Total					

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# Summary for Subcatchment D: POST WS D

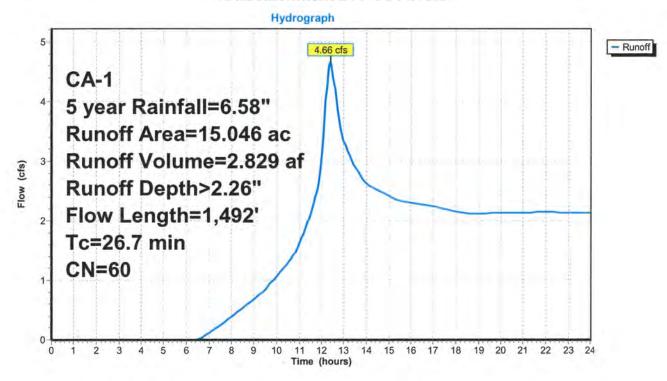
Runoff = 4.66 cfs @ 12.39 hrs, Volume=

2.829 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 5 year Rainfall=6.58"

	Area	(ac) (	CN Des	cription					
	10.	678	60 Woo	ods, Fair, F	ISG B				
	0.	047							
	1.417 56 Brush, Fair, HSG B								
* 2.641 61 >75% Vineyard, Good, HSG B						SG B			
*	* 0.263 75			>75% Vineyard, Good, HSG C					
	15.	046	60 Wei	ghted Aver	age				
	15.	046	100.	00% Pervi	ous Area				
	Тс	Length	•	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	8.3	100	0.1200	0.20		Sheet Flow, Post WS D			
						Woods: Light underbrush n= 0.400 P2= 5.09"			
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Post WS D			
						Woodland Kv= 5.0 fps			
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Post WS D			
						Woodland Kv= 5.0 fps			
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Post WS D			
_						Woodland Kv= 5.0 fps			
	26.7	1,492	Total						

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## Summary for Subcatchment D: POST WS D

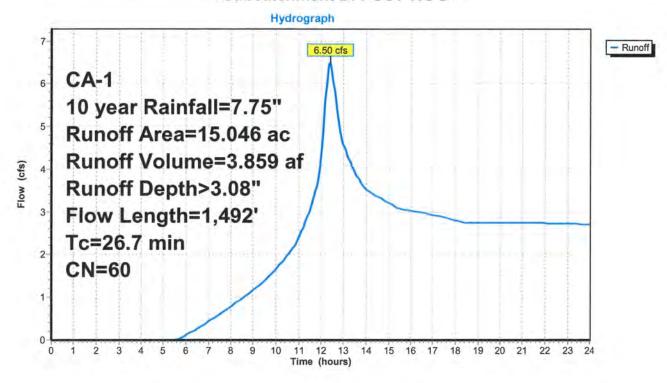
Runoff = 6.50 cfs @ 12.39 hrs, Volume=

3.859 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 10 year Rainfall=7.75"

	Area	(ac) (	ON Des	cription			
	10.	678	60 Woo	ds, Fair, F	ISG B		
	0.047 73 Woods, Fair, HSG C						
	1.417 56 Brush, Fair, HSG B						
*	, ,						
*	0.	263	75 >75°	% Vineyard	d, Good, HS	SG C	
	15.	046	60 Wei	ghted Aver	age		
	15.	046	100.	00% Pervi	ous Area		
	Тс	Length	•	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	8.3	100	0.1200	0.20		Sheet Flow, Post WS D	
						Woods: Light underbrush n= 0.400 P2= 5.09"	
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Post WS D	
						Woodland Kv= 5.0 fps	
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Post WS D	
						Woodland Kv= 5.0 fps	
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Post WS D	
						Woodland Kv= 5.0 fps	
	26.7	1,492	Total				

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# Summary for Subcatchment D: POST WS D

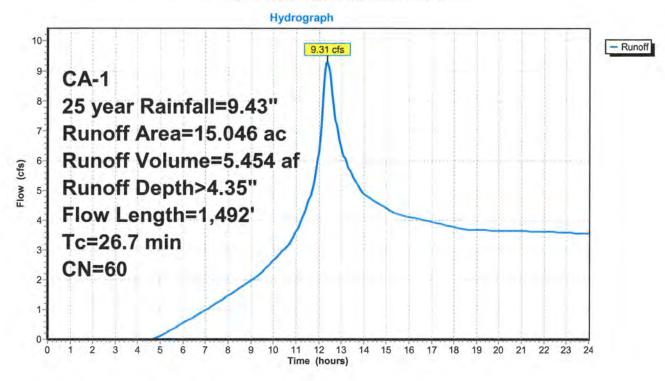
Runoff = 9.31 cfs @ 12.38 hrs, Volume=

5.454 af, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 25 year Rainfall=9.43"

	Area	(ac) (	ON Des	cription						
	10.	678	60 Woo	ods, Fair, F	ISG B					
	0.	047	73 Woo	Woods, Fair, HSG C						
	1.	417	56 Brus	Brush, Fair, HSG B						
*	2.641 61		61 >75	>75% Vineyard, Good, HSG B						
*	0.	263	75 >75	>75% Vineyard, Good, HSG C						
	15.046 60		60 Wei	ghted Aver	age					
	15.	046	100.	00% Pervi	ous Area					
	Тc	Length	Slope	Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	8.3	100	0.1200	0.20		Sheet Flow, Post WS D				
						Woods: Light underbrush n= 0.400 P2= 5.09"				
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Post WS D				
						Woodland Kv= 5.0 fps				
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Post WS D				
						Woodland Kv= 5.0 fps				
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Post WS D				
						Woodland Kv= 5.0 fps				
	26.7	1,492	Total							

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## Summary for Subcatchment D: POST WS D

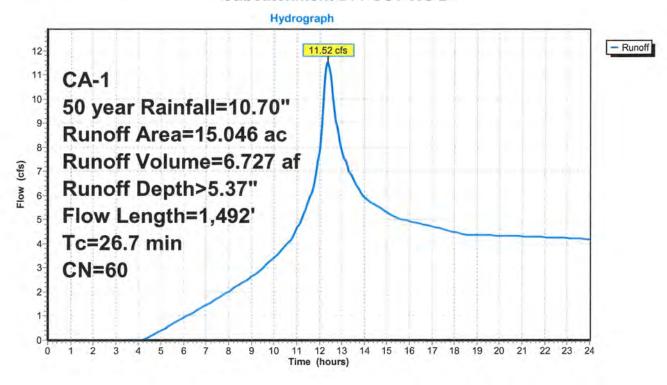
Runoff = 11.52 cfs @ 12.38 hrs, Volume=

6.727 af, Depth> 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 50 year Rainfall=10.70"

	Area	(ac) C	N Des	cription				
	10.	678						
	0.047 73 Woods, Fair, HSG C 1.417 56 Brush, Fair, HSG B							
*	* 2.641 61 >75% Vineyard, Good, HSG B							
*	0.	263	75 >75°	>75% Vineyard, Good, HSG C				
	15.	046	60 Wei	ghted Aver	age			
	15.	046	100.	00% Pervi	ous Area			
	Тс	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	8.3	100	0.1200	0.20		Sheet Flow, Post WS D		
						Woods: Light underbrush n= 0.400 P2= 5.09"		
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Post WS D		
						Woodland Kv= 5.0 fps		
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Post WS D		
						Woodland Kv= 5.0 fps		
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Post WS D		
_						Woodland Kv= 5.0 fps		
	26.7	1,492	Total					

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## **POST WS D R1**

Prepared by Napa Valley Vineyard Engineering
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## Summary for Subcatchment D: POST WS D

Runoff = 13.67 cfs @ 12.38 hrs, Volume=

7.970 af, Depth> 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs CA-1 100 year Rainfall=11.90"

	Area	(ac) C	N Des	cription					
	10.	678	30 Woo	ds, Fair, F	ISG B				
	0.	047	73 Woo	Woods, Fair, HSG C					
1.417 56 Brush, Fair, HSG B									
*	2.	641	61 >75°	% Vineyard	d, Good, H	SG B			
*	0.	263	75 >75°	>75% Vineyard, Good, HSG C					
	15.	046	30 Wei	ghted Aver	age				
	15.	046	100.	00% Pervi	ous Area				
	Tc	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	8.3	100	0.1200	0.20		Sheet Flow, Post WS D			
						Woods: Light underbrush n= 0.400 P2= 5.09"			
	6.9	463	0.0496	1.11		Shallow Concentrated Flow, Post WS D			
						Woodland Kv= 5.0 fps			
	2.1	336	0.2827	2.66		Shallow Concentrated Flow, Post WS D			
						Woodland Kv= 5.0 fps			
	9.4	593	0.0438	1.05		Shallow Concentrated Flow, Post WS D			
_						Woodland Kv= 5.0 fps			
	26.7	1,492	Total						

